
TRANSPORTATION ON THE GREAT LAKES.

[WITH AN ADDENDUM REPORT ON LAKE CHAMPLAIN.]

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BY THOMAS J. VIVIAN.

The Great Lakes, from which statistics of transportation are presented in the accompanying report, not only constitute one of the grandest geographical features of the North American continent, but they also afford the largest system of deep water inland navigation on the globe, containing as they do more than one-half its area of fresh water. Their combined area is 95,060 square miles, Lake Superior having 31,200, Lake Michigan 22,450, and Lakes Huron and St. Clair 24,210 square miles of surface. In the order of their topographical relationship, and considering them as vast expansions of the upper waters of the St. Lawrence river, they lie, beginning at the northwest, in the following order: Superior, Michigan, Huron, St. Clair, Erie, and Ontario. Lying in a general direction east and west, between the 41st and 47th parallels, the system extends from tidewater on the St. Lawrence and (including the Erie canal) from tidewater at New York 1,400 miles into the heart of the continent, the head of Lake Superior and the St. Lawrence tidewater being on the northernmost parallel, with Chicago and New York on the southern. The western extremity of the system is 1,700 miles only from the waters of the Pacific, and for one-half the distance between the two oceans these waters divide the Dominion from the Great Republic. The range of this fresh water system, it will be observed, is entirely within the limits of the north temperate zone, on the line on which population most freely moves westward, where final settlement is most compact, and where the climatic conditions insure the largest returns to capital and labor.

LEVELS AND WATERSHEDS.

Erie, Huron, and Michigan are nearly on the same level, the extreme difference between the first and the last named being only about 9 feet, while Superior is only 20 feet higher than Michigan, or 29 feet above Erie. In referring to the data of the levels of the Great Lakes in the chapter entitled "The physical features of the United States," the compiler of the "Statistical Atlas" for the Ninth Census says:

The divide between the Great Lakes and the waters flowing into the Mississippi and its tributaries is everywhere low, and at the lower end of Lake Michigan is so much so that only a small amount of excavation has been required to cause the waters which formerly flowed into the lake to run toward the Gulf of Mexico (via the Mississippi river).

The only great change of level between any two of the lakes is that which exists between Lake Ontario and Lake Erie, the former being 326 feet lower than the latter, about half the descent from one to the other being made in that single plunge known as the Falls of Niagara.

To what has been said may be added the geographical fact that 150 miles northwest of Duluth are the fountains of 3 of the greatest drainage systems of the continent, if not of the world, the physical conditions being such as to send flowing water northward into the ocean through Hudson bay, southward to the ocean through the Mississippi valley and the Gulf of Mexico, and eastward to the ocean through the lakes and St. Lawrence river.

The north drainage system has no traffic practicability; the commercial importance of that flowing southward is treated of in the chapter of this volume entitled "Transportation on the rivers of the Mississippi valley"; while the present chapter will show both the practicability and importance of the east drainage system.

Most of the preceding facts and figures, and many others that have not been referred to, will be found conveniently tabulated in the following statement:

| LAKES. | Area of water surface (square miles). | Area of watershed (square miles). | Aggregate area of basin (square miles). | Elevation of mean surface above surface level (feet). | Maximum depth (feet). | Deepest point below surface level (feet). | Mean annual rain and snow fall (inches). | Average discharge at outlets (cubic feet). |
|------------------------------|---------------------------------------|-----------------------------------|---|---|-----------------------|---|--|--|
| Total | 95,060 | 168,700 | 263,760 | <i>a</i> 516.8 | <i>a</i> 755 | <i>a</i> 339 | 31 | <i>a</i> 219,000 |
| Lake Ontario | 7,240 | 21,600 | 28,840 | 246.6 | 739 | 491 | 34 | 300,000 |
| Lake Erie | 9,960 | 22,700 | 32,660 | 572.9 | 210 | ..... | 34 | 265,000 |
| Lakes Huron and St. Clair... | 24,210 | 35,100 | 59,310 | 581.3 | 750 | 169 | 32 | 225,000 |
| Lake Michigan | 22,450 | 37,700 | 60,150 | 581.3 | 870 | 289 | 30 | ..... |
| Lake Superior | 31,200 | 51,600 | 82,800 | 601.8 | 1,008 | 406 | 29 | 86,000 |

a Average.

IMPORTANCE OF SITUATION.

Into the causes of the commercial importance of the Great Lakes it is scarcely the province of this article to enter. They constitute an accepted fact to every one at all acquainted with the geography and resources of this country, while the accompanying map will serve to indicate the extraordinary extent, productive power, and trade possibilities of the territory which is tributary to this greatest of all lacustrine systems. Debouching on the great lakes lie the states of Minnesota, Wisconsin, Illinois, Indiana, Michigan, Ohio, Pennsylvania, and New York, 8 empires embracing 416,360 square miles, which according to the present census have a population of 26,029,533; which contain the commercial metropoli of the land; whose products and demands are almost illimitable, and whose wealth is the moving financial factor of the nation. Of course there is no justifiable inference that all this population, all this producing power, all these needs, financial dictatorship, and commercial weight are tributary to the traffic of the lakes, but the fact remains that these states reach to the water's edge of either Superior, Michigan, Huron, Erie, or Ontario, and that while they are not tributary to the lakes they certainly contribute to the volume of their trade and to their importance as water ways. While this report, too, deals only with the American commerce of the lakes, it must not be forgotten that with but few exceptions they are bounded on the north by the dominion of Canada, and that the traffic of the ports along the northern shores is steadily growing. It will not be inappropriate to say here that the paramount question relating to the lake marine to-day is the construction of the so-called "20-foot channel"; for, while the great lakes are deep enough for any fleet, the connecting rivers have shoal places which seriously limit the draft of vessels passing through them. The "20-foot channel" contemplates the provision of a continuous passage of that depth through the connecting waters between Chicago, Duluth, and Buffalo, the cost of which work was estimated by General O. M. Poe to be \$2,379,058, these figures of course being outside of the then authorized improvements.

EARLY RECORDS.

It is a matter of history that in 1534 Jacques Cartier, a French navigator, acting under a commission from Francis I, sailed through the straits of Belle Isle and up the St. Lawrence; discovered Canada; landed at a point where is now situated Montreal, and took possession of this new territory in the name of the king of France. From 1603 to 1615 Samuel De Champlain, another French voyager, extended these discoveries and became the first governor of the French settlements in lower Canada. He explored Lake Champlain, gave to it his name, commenced a settlement at Quebec, and extended his explorations as far west as Lake Huron. Up to 1678 a regular sailing vessel had not been placed on the lakes, but in November of that year La Salle and Father Hennepin set sail on a schooner of 10 tons burden, which they had launched at a point near the present city of Kingston, Canada, out on Lake Ontario, and as they were unable to navigate beyond the mouth of the Niagara river, they continued their journey by land. In May, 1679, they launched the Griffin, the first sailing vessel to navigate the upper lakes, and in September, on their voyage westward, reached Green bay. The Griffin, laden with furs, was lost on the return trip, La Salle and Father Hennepin having continued their exploration to the Illinois and Mississippi rivers. From 1700 until 1756 the construction and navigation of sailing vessels was largely, if not entirely, confined to Lake Ontario.

In 1759 the English commenced to build and navigate sailing vessels upon lakes Erie and Ontario. Two sloops were launched at Oswego in 1760 named the Oswego and the Ontario, and about the same time a sloop and schooner, each of 60 tons burden, were built, while at the conquest of Canada in 1763 the English fleet was increased by the addition of the French merchant and whale vessels which then passed into the victor's possession.

Up to the time of the American Revolution there was little increase in the lake shipping, but from that time the commerce of Lake Ontario increased, and up to 1800 it exceeded the commerce of all the other lakes, although the first American steamer upon Lake Erie was built at Erie, Pennsylvania, in 1797.

Before entering upon a consideration of the lake traffic of to-day it will be well to look back for a short time to the beginnings of the trade and at the initial steps in the development of the resources of the circumjacent territory.

One of the chapters of the volume on transportation issued by the Tenth Census was entitled "History of Steam Navigation in the United States", and from that portion which treats of the Lakes the following extracts are drawn:

Previous to the war of 1812 quite a flourishing commerce was carried on upon Lake Ontario by sailing craft, but it was not till 1816 that the side-wheel steamer Ontario was built at Sacketts Harbor, going into service in April of the following year. This was the first steamer on the American side, the Frontenac coming out at about the same time on the Canadian side. The Ontario measured 231.57 tons, and had beam engines, 34-inch cylinders, of 4-foot stroke. She was broken up in 1832. The second steamer * * * was the Walk-in-the-water, which was launched at Black Rock, New York, in 1818. She was of 342 tons burden, and had low pressure engines. She arrived at Detroit August 22, 1818, on her first trip, and afterward traded as far as Mackinaw, Michigan, and was finally wrecked on the night of November 1, 1818, at Buffalo, New York. The Sophia, of 49.70 tons, was also built at Sacketts Harbor in 1818, so that up to 1820 there had been built only 4 steamers on the Lakes, including 1 steamer of 208.57 tons, built on Lake Champlain, as against 71, measuring 14,207.53 tons, on western rivers [those of the Mississippi valley], and 52, measuring 10,564.43 tons on the Atlantic coast. Within the next decade there had been built 8 steamers on the Lakes. The Superior, measuring 346.38 tons, came out at Buffalo in 1822; the Martha Ogden, 48.63 tons, at Sacketts Harbor in the following year, and the Pioneer, measuring 124.67 tons, at Buffalo in 1825, followed in 1826 by the Niagara, of 156.92 tons, the Henry Clay, of 301 tons, and at Cleveland by the Enterprise, measuring 219 tons, the William Penn, at Erie, measuring 214.71 tons, and 1 small craft of 93.82 tons, making 1,505.13 for the decade. * * * The steamer Sheldon Thompson, of 241 tons, built in 1829, made the first trip from Lake Erie to Chicago in 1832. She took up soldiers for the Black Hawk war. * * * The first steamer that arrived at Saginaw was the Governor Marcy, of 161 tons, commanded by Captain R. G. McKenzie. She went upon a regular route to that port about the year 1837. * * *

SHIPBUILDING IN THE FORTIES.

The first propeller built on the Lakes was the Vandalia, a sloop-rigged craft of about 138 tons. She was launched at Oswego in 1841. She was followed by the Oswego, of 150 tons, in 1842. In 1843 there were 7 propellers built at various points, as follows: The Hercules, 272 tons, at Buffalo; the Samson, 250 tons, at Perrysburg; the Emigrant, 275 tons, at Cleveland; the Racine, 150 tons, at Oswego; the New York, 150 tons, at Oswego; the Chicago, 150 tons, at Oswego; the Independence, 262 tons, at Chicago. In 1844 the Porter, of 310 tons, was built at Buffalo, and in 1845 the Syracuse came out at Oswego; the Princeton at Perrysburg, and the Phoenix at Cleveland. * * * The service of what is now known as the "river tugs" was inaugurated in 1845 by the side-wheel steamer Romeo, of 180 tons. She was followed by the Tecumseh, the Little Erie, the Telegraph No. 2, and the propeller Odd Fellow, in 1848. This service is now performed by a class of powerful tugs, that are used to tow sailing vessels through Detroit river, and for wrecking purposes. * * * Up to 1850 there had been built on the Lakes 50 propellers measuring 16,427 tons. * * * In 1855 the steam inspection service reported the number of steamers on the northern lakes as follows: licensed steamers, 128, measuring 68,089 tons, and unlicensed steamers, 115, measuring 21,252 tons. The next authentic statement of this tonnage was by the register of the Treasury in 1870, when 642 steamers, measuring 142,973.09 tons, were reported.

The reader who is curious to closely follow the growth of the lake fleet after the last date given in the preceding review up to the present time can do so without delay by referring to Tables 24 to 32 inclusive, or by turning to that part of this text wherein the subject is treated of under the head of "Comparative statistics."

PLAN OF THE TABLES.

For the presentation of the statistical results of the investigation by the Eleventh Census into the industry of Transportation on the Great Lakes and St. Lawrence river 33 tables have been prepared, their number and titles being as follows:

Equipment, occupation, and construction:

- Table 1.—Equipment of fleets in general.
- Table 2.—Equipment of fleets, by classes.
- Table 3.—Percentages of tonnage and valuation.
- Table 4.—Occupation, by class groups.
- Table 5.—Construction, by localities.
- Table 6.—Construction, by materials.

Traffic operations:

- Table 7.—Freight movement in general, by lakes.
- Table 8.—Freight movement in general, by principal ports.
- Table 9.—Freight movement in general (summarized).
- Table 10.—Freight receipts, by extended list of commodities.
- Table 11.—Freight shipments, by extended list of commodities.
- Table 12.—Freight movement of combined receipts and shipments, by extended list of commodities.
- Table 13.—Total freight movement, by extended list of commodities.
- Table 14.—Freight movement of unclassified commodities (A).
- Table 15.—Freight movement of unclassified commodities (B).
- Table 16.—Freight values.
- Table 17.—Freight movement, by cargo tonnage.
- Table 18.—Passenger traffic.

Earnings and expense accounts:

Table 19.—Financial account in general.

Table 20.—Expense account in detail.

Table 21.—Employés and wages, by ports.

Table 22.—Employés and wages, by lake totals.

Table 23.—Fuel account.

Comparative statistics:

Table 24.—Steamers, by classes, in 1880 and 1889.

Table 25.—Expense accounts in 1880 and 1889.

Table 26.—Crews and wages in 1880 and 1889.

Table 27.—Traffic in 1880 and 1889.

Table 28.—Fleets for the 10 years, 1880-1889.

Table 29.—Vessel tonnages for the 10 years, 1880-1889.

Table 30.—Tonnage fluctuations for the 10 years, 1880-1889.

Table 31.—Ship building for the 10 years, 1880-1889 (general).

Table 32.—Ship building for the 10 years, 1880-1889 (steamers).

Congressional appropriations:

Table 33.—Appropriations for lakes, by detailed localities.

While such a list as the preceding is useful to show at a glance the scheme on which the tabulation of the statistics has been carried out, it sometimes fails to show explicitly what a table contains, because of the necessity for condensation of titles, and in order to more clearly indicate the "Plan of the tables" the following synopsis is printed:

EQUIPMENT.

Table 1, "Equipment of fleets in general", shows the number, tonnage, and value of all steamers, sailing vessels, and unrigged craft, of over 5 tons burden, owned on the Great Lakes and St. Lawrence river in 1889, with separate entries by ports, grouped by lakes.

Table 2, entitled "Equipment of fleets, by classes", divides the entries of Table 1, separating the total number, tonnage, and value of all steamers, sailing vessels, and unrigged craft into classes, and retaining the separate entries by ports and the lake groups. The steamers are divided into 5 classes, namely, side-wheel passenger boats, propellers carrying both passengers and freight, propellers carrying freight only, tugs, and all other classes, while the sailing and unrigged vessels are divided into 3 classes, schooners, lake barges, and all other classes. By this allotment the number, tonnage, and value of each class of craft operating on the Great Lakes and St. Lawrence river may be readily seen.

OCCUPATION.

Table 3, entitled "Percentages of tonnage and valuation", gives the number, gross and net tonnage, estimated carrying capacity, commercial valuation, and value per gross ton of all vessels owned on the Great Lakes and St. Lawrence river, the great difference between this and the preceding table being that there are no entries by ports, that each lake fleet is subdivided into 17 classes of occupation, and that the percentage of both tonnage and valuation of each class to the lake totals are worked out.

Table 4, "Occupation, by class groups", gives the number, gross and net tonnage, estimated carrying capacity, commercial value, and value per gross ton of each of the 17 classes of vessels on each of the Great Lakes and St. Lawrence river, the headings in this case being the class of craft, and the entries being the respective lake totals of each class.

CONSTRUCTION.

There are 2 construction tables. The first, Table 5, "Construction, by localities", gives the number, tonnage, value, average value per ton, and average tonnage according to material of construction, of all vessels documented in the ports of the Great Lakes and St. Lawrence river, given by separate entries for each port.

The second construction table, Table 6, "Construction, by materials", gives the number, tonnage, value, average value per ton, and average tonnage of the same craft, but grouped according to material of construction, in contradistinction to the preceding table, in which the grouping is done by lakes.

TRAFFIC.

The statistics of traffic are presented in 12 tables, numbered consecutively from 7 to 18, inclusive. The first, Table 7, "Freight movement in general, by lakes", contains the receipts, shipments, total movement, percentage of traffic and commodity, excess of receipts over shipments, and excess of shipments over receipts of all freight moved on the Great Lakes and St. Lawrence river, dividing the commodities into the 4 following comprehensive classes:

Class I.—Products of agriculture.

Class II.—Products of mines and quarries.

Class III.—Other products (such as animal products and lumber).

Class IV.—Manufactures, miscellaneous merchandise, and other commodities.

This table is expanded into 6 subsidiary tables giving the receipts, shipments, and total movement of these classes of commodities, by lakes, together with the same calculations of percentages that are worked out in the table of totals.

Table 8, "Freight movement in general, by principal ports", follows the same plan of presenting the receipts, shipments, and total movement of all products, together with the percentage of traffic and commodity, except that it gives these figures for the 31 principal ports, with the smaller trading points presented together under the head of "All other ports", and a separate division or group being made for each of the 13 commodities embraced in the 4 comprehensive classes of products referred to in the preceding paragraph.

The third traffic table, Table 9, is a summarized statement of the freight movement, receipts, shipments, and total tonnage on the Great Lakes and St. Lawrence river entered up for all ports in the order of their traffic importance.

Table 10, entitled "Freight receipts, by extended list of commodities", is a statement of the receipts, by ports grouped according to their respective lakes, of a still more extended list of the articles embraced under the comprehensive heads of "Products of agriculture", "Products of mines and quarries", "Other products", and "Manufactures", the detailed list of commodities being increased from 13 to 26.

Table 11, "Freight shipments, by extended list of commodities", is a statement of the port shipments of all commodities similarly arranged with the preceding table of receipts.

Table 12, "Freight movement of combined receipts and shipments, by extended list of commodities", is a statement of both the port receipts and shipments of the articles given in Tables 10 and 11.

Table 13, "Total freight movement, by extended list of commodities", gives the receipts and shipments of all commodities by lake totals only, the detailed entries for the ports being omitted.

Table 14, "Freight movement of unclassified commodities (A)", gives the receipts and shipments by ports of those commodities for which no weight was furnished and which do not appear in the other tables, such commodities, for instance, as unweighed packages, cases, and parcels.

Table 15, "Freight movement of unclassified commodities (B)", is a description and an estimated weight in pounds of each unit of measurement mentioned in Table 14, worked out to an estimated result in tons.

Table 16. In this table, entitled "Freight values", an estimated value per ton is put on all the commodities moved, and the result in total values is worked out.

In the preceding tables of freight movement the volume of traffic was the aggregate of receipts and shipments for all ports, but in Table 17, entitled "Freight movement, by cargo tonnage", an aggregation is made of the single item of receipts or of shipments, according to whichever happened to be the larger.

Table 18. The passenger movement recorded in this table is confined to that on board steamers, is entered for the different ports for which a passenger traffic was reported, and is classified as belonging to regular passenger lines, to excursion boats, and to ferry service.

EARNINGS AND EXPENSE ACCOUNTS.

Table 19, entitled "Financial account in general", is almost a balance sheet of the industry of Water Transportation on the Great Lakes, showing, as it does, the gross earnings, expenses, and remaining net earnings of the lake fleet reporting financial operations, the entries being made for the ports of registration, with totals for those lakes to which the ports belong.

In making out Table 20, entitled "Expense account in detail", the expenses of reporting vessels, following the same division of ports of registration and lakes, are divided into the various items of port charges, wages, provisions, current repairs, fuel (for the steamers), other running expenses, commissions, insurance, taxes, and office expenses, the 10 principal items which constitute the shore and running expenses.

EMPLOYÉS.

A still further subdivision of expenses is made in Table 21, "Employés and wages, by ports". Here, however, one item only is selected, that being the interesting one of wages, and the average wages paid in each port to all grades of employés from captain to cook and from first engineer to ship's boy is given, together with the number of persons making up the ordinary crews required as the complement of all reporting craft, the number of persons receiving employment during the year in the operation of these vessels, and the average wages paid to each grade of employés in the respective ports.

Table 22, "Employés and wages, by lake totals", is really a résumé of Table 21, taking up, as it does, the total number of employés of each grade and the total monthly wages paid on the different lakes for such vessels as reported on wages and crews.

FUEL ACCOUNT.

Table 23, entitled "Fuel account", applies, of course, only to steamers. These steamers, however, are grouped under the class heads of (1) passenger, passenger and freight, and freight steamers; (2) ferryboats; (3) towboats, and (4) miscellaneous. For each of these classes and for each port the number of tons of coal and the number of cords of wood consumed in their operations are set down, together with the cost of the material.

COMPARATIVE STATISTICS.

All the tables which have been previously considered present only what may be called the positive statistics for 1889, whereas the 9 tables numbered inclusively 24 to 32 give the comparative statistics either for the 2 years 1880 and 1889 or for the 10 years 1880-1889, inclusive. In the first 4 tables the 2 years of report alone are taken into consideration, the items being gathered from the transportation volume issued by the Census Office for 1880 and from the schedules of the present inquiry. Because of the restricted scope of the inquiry by the Tenth Census, comparisons of a very limited character only can be afforded. All that is possible in this direction in fact is given in Tables 24, 25, 26, and 27, which deal respectively with the number, tonnage, and value; the expense account; the crews and wages, and the traffic in bulk of the steamer fleets, no investigation having been made into either the equipment or the operations of sailing vessels. In Table 24 a partial classification of the steamer fleet has been possible, and the equipment figures are allotted to passenger and freight boats, ferry, towing, and harbor, and miscellaneous employed steamers; but in Tables 25, 26, and 27 the unit of comparison is the very comprehensive one of a total for all the lakes, whether for the items of expenses, wages, crews, or freight and passenger traffic.

Tables 28, 29, 30, 31, and 32 have been largely made up from information furnished this office by the Commissioner of Navigation. In Table 28 there are given the figures showing the number and tonnage of all steamers, sailing vessels, and barges registered in the customs districts of the Great Lakes for the 10 years 1880-1889, inclusive.

In Table 29 the average tonnage of each steamer, sailing vessel, and barge fleet belonging to each port is worked out for the decade in question, while Table 30 gives the fluctuations from the annual average number and the annual average tonnage of all vessels registered in the different customs districts. Tables 31 and 32 are records of shipbuilding for the period in question, the first giving the number and tonnage of all steamers, sailing vessels, and barges built during those years in the various customs districts, and the second (Table 32) furnishing the data to show the number and tonnage of all steamers built in the various districts, arranged according to their methods of propulsion, that is, whether propellers or side-wheel or stern-wheel steamers.

CONGRESSIONAL APPROPRIATIONS.

The last of the tables (Table 33) gives the amounts appropriated by Congress for the survey, improvement, and maintenance of the harbors on the Great Lakes and of the rivers flowing into them, from the date of the earliest appropriation down to and including that of the act of Congress of September, 1890. These sums, so far as the grouping of periods is concerned, are given: first, up to and including 1879; second, from 1880 to 1889, inclusive; third, the appropriations in 1890, and fourth, the total appropriations from first to last. So far as localities are concerned, these sums are given with considerable detail, the items not only being furnished for each lake but for each river, bay, and harbor on which the government money has been spent.

LOCALITIES OF REGISTRATION, EQUIPMENT, AND TRAFFIC.

At the risk of introducing a long parenthesis it will be advisable, before taking up the consideration of what the tables show, to explain the various localities to which the records of registration, equipment, or traffic are allotted.

In the first place, there are on the Great Lakes and St. Lawrence river 20 ports of registration, which, grouped by states and by lakes and rivers, are as follows:

BY STATES.

Ogdensburg, New York.
Cape Vincent, New York.
Alexandria Bay, New York.
Clayton, New York.
Oswego, New York.
Rochester, New York.
Suspension Bridge, New York.
Buffalo, New York.
Dunkirk, New York.
Erie, Pennsylvania.
Cleveland, Ohio.
Sandusky, Ohio.
Toledo, Ohio.
Detroit, Michigan.
Grand Haven, Michigan.
Marquette, Michigan.
Port Huron, Michigan.
Chicago, Illinois.
Milwaukee, Wisconsin.
Duluth, Minnesota.

BY LAKES AND RIVERS.

Ogdensburg, St. Lawrence river.
Cape Vincent, St. Lawrence river.
Alexandria Bay, St. Lawrence river.
Clayton, St. Lawrence river.
Oswego, Lake Ontario.
Rochester, Lake Ontario.
Suspension Bridge, Lake Erie.
Buffalo, Lake Erie.
Dunkirk, Lake Erie.
Cleveland, Lake Erie.
Sandusky, Lake Erie.
Toledo, Lake Erie.
Erie, Lake Erie.
Grand Haven, Lake Michigan.
Chicago, Lake Michigan.
Milwaukee, Lake Michigan.
Detroit, Lake Huron.
Port Huron, Lake Huron.
Marquette, Lake Superior.
Duluth, Lake Superior.

The preceding 20 ports, called ports of registration, are those in which all the vessels of the Great Lakes are documented, and which form the recognized centers where the Treasury Department keeps its lists of vessels, their character, tonnage, and construction. In the reports on the Atlantic coast, Gulf of Mexico, and Pacific coast, these ports of registration have been strictly followed in the tabulation of the statistics of equipment and of traffic, but because of the exigencies of locality it has been found necessary to make arbitrary assignments of the statistics in both the Mississippi valley and the Great Lakes. In the report on the Mississippi valley, for instance, it will be found that the segregation of all statistics is made by the rivers and fluvial systems, while in the case of the Great Lakes and St. Lawrence river it has been found advisable to make allotment of the statistics of equipment to what may be called the ports of frequent hail, and the statistics of traffic to the ports where records of business are kept. These two lists of ports are given below:

PORTS OF ASSIGNMENT FOR STATISTICS OF EQUIPMENT.

| LAKE SUPERIOR. | LAKE MICHIGAN—continued. | LAKE ERIE—continued. |
|--|--|---|
| Ashland, Wisconsin. Baraga, Michigan. Bayfield, Wisconsin. Duluth, Minnesota. Marquette, Michigan. Pequaming, Michigan. Republic, Michigan. St. Marys Falls, Michigan. Superior, Wisconsin. | Holland, Michigan. Kenosha, Wisconsin. Kewaunee, Wisconsin. Ludington, Michigan. Manistee, Michigan. Manitowoc, Wisconsin. Menominee, Michigan. Milwaukee, Wisconsin. Montague, Michigan. Muskegon, Michigan. North Port, Michigan. Onkama, Michigan. Pentwater, Michigan. Peshtigo, Wisconsin. Petoskey, Michigan. Racine, Wisconsin. St. James, Michigan. St. Joseph, Michigan. Saugatuck, Michigan. Sheboygan, Wisconsin. South Haven, Michigan. Spring lake, Michigan. Sturgeon bay, Wisconsin. Suttons bay, Michigan. Traverse city, Michigan. Troy, Wisconsin. Waukegan, Illinois. Waukesha, Wisconsin. Whitehall, Michigan. | Erie, Pennsylvania. Fairport, Ohio. Fremont, Ohio. Gratwick, Ohio. Huron, Ohio. Lorain, Ohio. Milan, Ohio. Norwalk, Ohio. Port Clinton, Ohio. Put in Bay, Ohio. Sandusky, Ohio. Suspension Bridge, New York. Toledo, Ohio. Tonawanda, New York. Vermilion, New York. |
| LAKES HURON AND ST. CLAIR. | LAKE ERIE. | LAKE ONTARIO. |
| Algonac, Michigan. Alpena, Michigan. Bay city, Michigan. Caseville, Michigan. Cheboygan, Michigan. Detroit, Michigan. East China, Michigan. East Saginaw, Michigan. Marine city, Michigan. Mount Clemens, Michigan. New Baltimore, Michigan. Oscoda, Michigan. Port Huron, Michigan. Saginaw, Michigan. St. Clair, Michigan. | Ashtabula, Ohio. Avon, Ohio. Buffalo, New York. Cleveland, Ohio. Dunkirk, New York. | Cape Vincent, New York. Charlotte, New York. Chaumont, New York. Hamlin, New York. Henderson, New York. Medina, New York. Oswego, New York. Pultneyville, New York. Rochester, New York. Sacketts Harbor, New York. Sodus Point, New York. Troy, New York. Wilson, New York. Youngstown, New York. |
| LAKE MICHIGAN. | ST. LAWRENCE RIVER. | Alexandria Bay, New York. Clayton, New York. Ogdensburg, New York. |
| Benton Harbor, Michigan. Charlevoix, Michigan. Chicago, Illinois. Escanaba, Michigan. Fort Howard, Wisconsin. Frankfort, Michigan. Grand Haven, Michigan. Green Bay, Wisconsin. | | |

PORTS OF ASSIGNMENT FOR STATISTICS OF TRAFFIC.

| LAKE SUPERIOR. | LAKES HURON AND ST. CLAIR—continued. | LAKES HURON AND ST. CLAIR—continued. |
|--|---|--|
| Ashland, Wisconsin. Baraga, Michigan. Bay Mills, Michigan. Duluth, Minnesota. Houghton, Michigan. Marquette, Michigan. Ontonagon, Michigan. Pequaming, Michigan. St. Marys Falls, Michigan. Superior, Wisconsin. Two Harbors, Minnesota. Washburn, Wisconsin. | Alpena, Michigan. Bay city, Michigan. Black river, Michigan. Cheboygan, Michigan. Detroit, Michigan. East Saginaw, Michigan. East Tawas, Michigan. Forestville, Michigan. Marine city, Michigan. Marysville, Michigan. Oscoda, Michigan. Port Huron, Michigan. Port Sanilac, Michigan. Rogers, Michigan. St. Clair, Michigan. | St. Ignace, Michigan. Sand Beach, Michigan. Sebawaing, Michigan. LAKE MICHIGAN. Benton Harbor, Michigan. Charlevoix, Michigan. Chicago and South Chicago, Illinois. Cross village, Michigan. Depere, Wisconsin. Elk Rapids, Michigan. Escanaba, Michigan. Fayette, Michigan. Ford River, Michigan. Fruitport, Michigan. |
| LAKES HURON AND ST. CLAIR. | | |
| Algonac, Michigan. | | |

PORTS OF ASSIGNMENT FOR STATISTICS OF TRAFFIC—Continued.

LAKE MICHIGAN—continued.

Gladstone, Michigan.
 Glen Arbor, Michigan.
 Grand Haven, Michigan.
 Green Bay, Wisconsin.
 Kenosha, Wisconsin.
 Kewaunee, Wisconsin.
 Leland, Michigan.
 Ludington, Michigan.
 Manistee, Michigan.
 Manistique, Michigan.
 Manitowoc, Wisconsin.
 Marinette, Wisconsin.
 Menominee, Michigan.
 Michigan city, Indiana.
 Milwaukee, Wisconsin.
 Montague, Michigan.
 Muskegon, Michigan.
 Oconto, Wisconsin.
 Pentwater, Michigan.
 Peshtigo Harbor, Wisconsin.
 Petoskey, Michigan.
 Port Washington, Wisconsin.
 Racine, Wisconsin.
 St. Joseph, Michigan.

LAKE MICHIGAN—continued.

Sheboygan, Wisconsin.
 South Haven, Michigan.
 Traverse, Michigan.
 Two Rivers, Michigan.
 Waukegan, Illinois.

LAKE ERIE.

Ashtabula, Ohio.
 Buffalo, New York.
 Cleveland, Ohio.
 Dunkirk, New York.
 Erie, Pennsylvania.
 Fairport, Ohio.
 Huron, Ohio.
 Kelley's Island, Ohio.
 Lorain, Ohio.
 Sandusky, Ohio.
 Toledo, Ohio.
 Tonawanda, New York.

LAKE ONTARIO.

Cape Vincent, New York.
 Charlotte, New York.
 Chaumont, New York.

LAKE ONTARIO—continued.

Dexter, New York.
 Henderson, New York.
 Millins Bay, New York.
 Oak Orchard, New York.
 Olcott, New York.
 Oswego, New York.
 Pultneyville, New York.
 Sacketts Harbor, New York.
 Sandy creek, New York.
 Sodus Point, New York.
 Wilson, New York.
 Youngstown, New York.
 Fairhaven, New York.

ST. LAWRENCE RIVER.

Alexandria Bay, New York.
 Chippewa bay, New York.
 Clayton, New York.
 Massena, New York.
 Grindstone island, New York.
 Morristown, New York.
 Ogdensburg, New York.
 Thousand Island Park, New York.
 Waddington, New York.

WHAT THE TABLES SHOW.

Following the consideration of the "Plan of the tables", the next step will be an inquiry as to what the tables show.

From the first of the whole series of the 33 tables it appears that on the Great Lakes and St. Lawrence river in the year ending December 31, 1889, the floating equipment numbered 2,737 craft, having a tonnage of 920,294 and an estimated commercial value of \$48,580,174. The components of this fleet were 1,467 steamers, with a tonnage of 595,813 and a value of \$40,868,824; 962 sailing vessels, with a tonnage of 185,081 and a value of \$4,238,850, and 308 unriggered craft, with a tonnage of 139,400 and a value of \$3,472,500. The various vessels that make up the preceding totals are entered for the ports which were given in the list on page 9 entitled "Ports of assignment for statistics of equipment", together with totals for the lakes on which these ports are found. These totals show that on Lake Superior there were at the close of 1889 167 vessels of all kinds, with a tonnage of 39,653 and a value of \$2,763,500; that the fleets on lakes Huron and St. Clair numbered 726, with a tonnage of 262,833 and a value of \$13,107,650; that the Lake Michigan fleet amounted to 1,003 craft, with a tonnage of 196,216 and a value of \$9,114,400; that the floating equipment on Lake Erie numbered 667, with a tonnage of 392,903 and a value of \$22,163,824; that on Lake Ontario there were 131 vessels, with a tonnage of 15,859 and a value of \$676,300; while on St. Lawrence river there were owned 43 vessels, with a tonnage of 12,830 and a value of \$754,500.

Table 2 presents the totals of the preceding table under the various heads of side-wheel passenger, propellers carrying both passengers and freight, propellers carrying freight only, tugs, schooners, and lake barges, together with their respective number, tonnage, and value. These details are given for the same 98 ports that were quoted in the preceding table. One of the most interesting facts shown by this table is that nearly two-thirds the vessels on the Great Lakes are assigned to 7 of these ports, namely, Chicago, Port Huron, Detroit, Milwaukee, Grand Haven, Cleveland, and Buffalo.

Some idea of the size of these port fleets may be gathered from the following summary, which shows the number and tonnage of certain classes of vessels which are assigned to them:

TABLE A.—SUMMARY SHOWING THE NUMBER AND TONNAGE OF CLASSIFIED VESSELS FOR THE SEVEN LEADING PORTS, TO WHICH HAVE BEEN ASSIGNED THE STATISTICS OF EQUIPMENT ON THE GREAT LAKES FOR 1889.

| CITIES. | Total. | | Propellers carrying both passengers and freight. | | Propellers carrying freight only. | | Schooners. | | Barges. | | All other classes. | |
|----------------------------|---------|----------|--|----------|-----------------------------------|----------|------------|----------|---------|----------|--------------------|----------|
| | Number. | Tonnage. | Number. | Tonnage. | Number. | Tonnage. | Number. | Tonnage. | Number. | Tonnage. | Number. | Tonnage. |
| Grand total..... | 2,737 | 920,294 | 303 | 143,907 | 433 | 388,978 | 917 | 184,029 | 301 | 138,404 | 783 | 64,976 |
| Total of the 7 ports | 1,814 | 638,599 | 167 | 101,198 | 340 | 310,316 | 622 | 120,302 | 120 | 58,514 | 547 | 48,274 |
| Chicago..... | 339 | 71,260 | 34 | 13,181 | 28 | 10,980 | 155 | 35,859 | 18 | 6,255 | 104 | 5,005 |
| Port Huron..... | 293 | 61,482 | 11 | 1,887 | 73 | 40,840 | 100 | 6,302 | 21 | 6,797 | 88 | 5,656 |
| Detroit..... | 275 | 129,768 | 17 | 8,565 | 56 | 56,994 | 83 | 19,074 | 44 | 21,387 | 75 | 23,748 |
| Milwaukee..... | 259 | 61,694 | 12 | 3,282 | 53 | 30,172 | 129 | 13,034 | 6 | 2,246 | 59 | 3,960 |
| Grand Haven..... | 225 | 22,308 | 31 | 5,750 | 23 | 6,305 | 74 | 4,784 | 1 | 618 | 96 | 4,851 |
| Cleveland..... | 219 | 163,227 | 19 | 33,986 | 66 | 82,979 | 64 | 30,873 | 19 | 12,302 | 51 | 2,087 |
| Buffalo..... | 204 | 128,860 | 43 | 34,542 | 50 | 72,066 | 17 | 10,376 | 20 | 8,909 | 74 | 2,967 |
| Total other ports | 923 | 281,695 | 136 | 42,714 | 84 | 78,662 | 295 | 63,727 | 172 | 79,890 | 236 | 16,702 |

A SERIES OF PERCENTAGES.

In Table 3 the 2,737 craft which constituted the total fleet of the Great Lakes and St. Lawrence river are subjected to a series of percentage calculations, one of which pertains to tonnage and the other to valuation, from which may be learned what proportion the tonnage or the value of any particular class of vessels bore to the total tonnage or total value of all vessels on the particular lake named, and what proportion the tonnage or the value of any particular class of vessels bore to the total tonnage of that class of vessels on all these waters. For example, it appears that the gross tonnage of steam propellers carrying freight only on Lake Superior was 13,517 tons, or 34.09 per cent of the gross tonnage on that lake. It also appears that the tonnage of steam propellers carrying freight only constituted but 3.47 per cent of the total tonnage of such vessels. Turning next to the subject of valuation, it is seen that the total value of steam propellers on Lake Superior carrying freight only was \$898,500, which was 32.51 per cent of the total value of all vessels on Lake Superior, or 3.83 per cent of the total value of this class of vessels on all the lakes. Similar percentages are given for each lake and for each of the 17 classes of vessels, side-wheel passenger, propellers carrying both passengers and freight, propellers carrying freight only, tugs, ferries, pleasure yachts, pile drivers, sand dredges, sand boats, fire boats, steam lighters, unclassified vessels, schooners, lake barges, scows, sloops, and yawls.

In Table 4 each of the 17 classes is considered separately, the details of number, gross and net tonnage, estimated carrying capacity, commercial value, and value per gross ton being entered to the credit of each class from each lake. That is, for example, it is shown that on all the lakes there were 62 side-wheel passenger steamers, of which number 23 were employed on lakes Huron, and St. Clair, 22 on Lake Michigan, 10 on Lake Erie, 4 on Lake Ontario, and 3 on the St. Lawrence river; that the gross tonnage of these 62 side-wheel passenger steamers found on all the lakes was 27,259, of which the Huron and St. Clair proportion was 17,729 tons, the Michigan proportion 5,879 tons, the Erie proportion 2,221 tons, the Ontario proportion 553 tons, and the St. Lawrence river proportion 877 tons. Similar entries for all the lakes are made for the other items and the other classes which have been mentioned. Material will be found also in this table for a calculation showing the average tonnage, average commercial value, and average commercial value per ton of all the 17 classes of craft mentioned; and in the accompanying summary these averages will be found worked out for the 5 principal classes of vessels:

TABLE B.—SUMMARY SHOWING THE AVERAGE TONNAGE AND AVERAGE COMMERCIAL VALUE PER CRAFT AND PER TON OF THE 5 PRINCIPAL CLASSES OF VESSELS OPERATING ON THE GREAT LAKES AND ST. LAWRENCE RIVER IN 1889.

| CLASSES OF CRAFT. | Average tonnage. | Average commercial value. | Average commercial value per ton. |
|--|------------------|---------------------------|-----------------------------------|
| Propellers carrying both passengers and freight. | 475 | \$36,208 | \$76.24 |
| Propellers carrying freight only | 898 | 54,131 | 60.26 |
| Tugs | 50 | 5,228 | 104.55 |
| Schooners | 201 | 4,599 | 22.88 |
| Lake barges | 460 | 11,507 | 25.02 |

STATISTICS OF CONSTRUCTION.

Tables 5 and 6 present the same statistics but in two methods. They correspond, in fact, in the plan of their presentation, with the two preceding tables. The first takes up each lake as a group and for each of the ports belonging to that lake enters up the number, tonnage, value, average value per ton, and average tonnage of each fleet, classed by material of construction. That is, the entries for the port of Duluth, which is on Lake Superior, are that the fleet of that port included 3 vessels of steel, 2 of iron, 33 of wood, and 1 of composite material; that the tonnage of Duluth's 3 steel vessels was 2,684, that their value was \$175,000, that their average value per ton was \$65, and that their average tonnage per craft was 895; that the tonnage of Duluth's 2 iron vessels was 98 tons, their value \$20,000, their average value per ton \$204, and their average tonnage 49, and so on all through the list. Without taking up the details of the ports, there is gathered from Table 5 that Marquette's fleet included 4 steel vessels, which were valued at \$900,000, and had an average tonnage of 2,476; that Detroit's fleet included 258 wooden vessels, whose average tonnage was but 408, but whose aggregate value was \$4,936,800; that Chicago's wooden fleet numbered 335 vessels, valued at \$2,723,350, while Milwaukee's wooden fleet numbered only 256, but was valued at \$3,123,000; that Buffalo's fleet included 14 steel vessels, which had the high average tonnage of 2,132 per vessel, and an aggregate value of \$2,950,000, and that Cleveland's wooden fleet was even more valuable than Milwaukee's, the 208 vessels of that material accredited to the principal port on Lake Erie being valued at \$7,035,800.

In Table 5 the facts connected with material of construction were assigned chiefly to localities, while in Table 6 the details are assigned chiefly to the material of construction. That is, in Table 5 the headings were the lakes, while in Table 6 the headings are the materials. One sees, for instance, that on all the lakes there were 40 vessels of steel, which had a tonnage of 75,488, a value of \$7,349,000, an average value per ton of \$97, and an average tonnage of 1,887; that the iron fleet numbered 45 vessels, with a tonnage of 35,922, a value of \$3,225,224, and an average value per ton of \$90, and an average tonnage of 798; that the composite numbered 11, having a tonnage of 14,756, a value of \$1,228,000, an average value per ton of \$83, and an average tonnage of 1,341 per vessel; and that the lake wooden fleet was 2,641 vessels, at an aggregate tonnage of 794,128, an aggregate value of \$36,777,950, an average value per ton of \$46, and an average tonnage per vessel of 301. The same figures of aggregates and averages are given for each port, and there is the material for many valuable calculations which those interested in lake statistics will doubtless find it useful to work out.

FREIGHT TRAFFIC.

The statistics of freight traffic will be found presented in 12 tables, numbered from 7 to 18, inclusive. In all of these, with the exception of the last 3, the amounts of freight moved are given respectively as those of "Receipts", "Shipments", and "Total movement". Trade between American and Canadian ports is included in these statements, but the coastwise trade between Canadian ports is of course excluded. The division of the commodities into the 4 groups entitled "Products of agriculture", "Products of mines and quarries", "Other products", and "Manufactures, miscellaneous merchandise, and other commodities", set down in Table 7, has been made, because under these groups the principal articles of the lake commerce can be properly placed, and because this classification conforms in a general way to that adopted for all transportation statistics, thus providing for an easy comparison between lake traffic and the traffic of other sections of the country. It may be added here that the sources from which these statistics of traffic have been obtained are, first, reports from the customs offices of receipts and shipments; second, reports from leading shippers at ports having no customs offices; and third, reports from the important transportation lines operating on the Great Lakes and covering that portion of the traffic not included in port manifests. The reports of the boards of trade in the important cities have also been made use of to check and correct the information thus obtained, and it is believed that the figures presented are trustworthy and accurate.

LOCALIZATIONS OF TRADE.

In Table 7 the localization is made according to the lakes, and, in addition to the division of freight into the groups of locality and those of commodity, which have already been referred to, it contains a number of interesting percentages. These include not only the per cent of total traffic and the per cent of total commodity contributed by each lake to that traffic, but there also is a summary given in which the same percentages are applied to the excess of total shipments over total receipts, and excess of total receipts over total shipments.

A few words are necessary to explain these percentage columns. The first inserted alike under "Receipts", "Shipments", and "Total movement", shows what proportion the traffic of any commodity named bears to the total freight movement on the body of water for which the statistics are compiled. For example, the shipments of iron ore on Lake Superior were 4,141,057 tons, or 76.20 per cent of the total shipments of all commodities on that lake. These figures, therefore, indicate the relative importance of the various commodities in the commerce of the waters named. The percentage columns of the summary giving the total traffic show what proportion the traffic in any commodity named on a given lake bears to the total traffic in the same commodity on all the lakes.

For example again, Table 7 shows the total shipments of iron ore to have been 7,677,107 tons, while the shipments of that commodity from Lake Superior ports were, as has been seen, 4,141,057 tons, or 53.94 per cent of the total shipments of all iron ore on the Great Lakes and St. Lawrence river.

The most interesting point in connection with this summary of Table 7 is that part of it in which is given a balance sheet of receipts and shipments. From this it appears that the total receipts exceeded the total shipments by 669,158 tons, or 2.58 per cent of the aggregate freight traffic of all the lakes.

RECEIPTS AND SHIPMENTS.

It may be stated here that the only commodities of which the receipts and shipments nearly balanced are iron ore, flour, shingles, and pig iron. Table 7 does not separate the figures respecting these commodities except for iron ore, but in the commodity tables 10, 11, 12, and 13, such a separation has been effected for a number of commodities, and from the data there given many interesting balances may be struck.

For most of the other commodities the difference between receipts and shipments is quite marked. Coal, for example, shows an excess of shipments over receipts of 943,328 tons, or 15.45 per cent. This is in large measure explained by the fact that 562,834 tons of coal were exported from American ports on Lake Ontario to Canada, and that 25,931 tons are reported to have passed through the Welland canal. This leaves 354,563 tons to be accounted for. In the case of a commodity like coal, which is so universally used, it is fair to say that this excess was shipped to Canadian ports west of the Welland canal and to small ports within the United States, of which there is no record.

The shipments of wheat exceeded receipts by 1,666,267 bushels, or 49,988 tons. This is accounted for by the export of wheat to Canada, which passed through the Welland canal and St. Lawrence river to Montreal.

The shipments of corn exceeded the receipts by 12,346,893 bushels, or 345,713 tons. This shows an excess of shipments over receipts of 17.92 per cent. On investigation, however, it was found that 7,376,786 bushels of corn were exported to Canada via the Welland canal, and 3,758,427 bushels were shipped to Sarnia and Georgian bay for transshipment in bond through Canada to points in the United States.

The summary of Table 7 also shows that the shipments of "Other grains" exceeded receipts by 25,720 tons. This was principally due to the excess of shipments of oats over receipts, amounting to 7,890,593 bushels. Of this amount it was learned that 4,937,889 bushels were shipped to Sarnia and Georgian bay ports for transportation through Canada, and the remainder, it is believed, consisted of direct exports to Canada and of shipments to small ports on the Great Lakes, where no customs offices were located and no records of receipts were kept.

SAMPLE MOVEMENTS.

The discrepancy observed between the receipts and shipments of "All other farm products", 42,852 tons, was due to the fact that the commodities included under this head were shipped from small ports, of which they formed a considerable portion of the total traffic, and were given separately in the reports made, whereas they were received at large ports and were reported under the head of "Miscellaneous".

Lumber shows an excess of receipts over shipments of 676,244,000 feet, or 1,508,859 tons, making 22 per cent of total shipments. This was partly due to the heavy importation of Canadian lumber and partly to the fact that lumber was shipped in considerable quantities from a large number of isolated mills located at remote points on the more western lakes, where no record of shipments was kept or could be obtained.

No satisfactory explanation can be given of the fact that the receipts of salt exceeded shipments by 43,676 tons. It should be stated, however, that much confusion arose in the estimates of this commodity from the fact that it was shipped both in sacks and barrels, and that the custom house authorities of various ports failed to follow the same rule in converting it into tons.

The excess of receipts of stone over shipments, which amounts to 74,801 tons, is due to the fact referred to in the case of lumber, that is to say, the sources from which stone was obtained did not permit a correct statement of shipments.

RELATIVE IMPORTANCE OF TRADING POINTS.

Another form of localization is adopted in Table 8, entitled "Freight movement in general, by ports". Here the side lines are 31 selected ports, instead of the 4 comprehensive groups of commodities as they were in Table 7, while each commodity is made the title of a separate table. These 31 ports, it should be stated, have been selected because they had a total freight traffic of 250,000 tons or over. The percentages in Table 8 are equally interesting with those of Table 7.

The first column of percentages, given alike under "Receipts", "Shipments", and "Total movement", shows what proportion of traffic in the commodity in question was done by the port named. For example, the total shipments of wheat were 969,150 tons, of which Chicago shipped 312,203 tons, or 32.21 per cent of the total wheat traffic reported. The second column of percentages is designed to show what proportion of the total traffic of any port was due to the receipts and shipments of any commodity named. For example, the total shipments from Chicago amounted to 2,914,065 tons, 10.71 per cent of which, or 312,203 tons, was, as has been seen,

shipments of wheat. By referring, therefore, to the columns of percentages three important facts may be learned: first, the relative importance of any particular port in the traffic of any commodity named; second, the relative importance of any commodity in the traffic of any port named; third (by referring to the summary), the relative importance of any port in the total traffic of the Great Lakes and St. Lawrence river.

An example of the first calculation of percentages is found in that part of the table which refers to the movement of iron ore. Here it is seen that, so far as shipments went, Escanaba exported 3,364,067 tons of that product, or 43.82 per cent of the total iron ore exporting traffic on these waters; but as this port's traffic in iron ore was confined to its exportation, its percentage of the total iron ore movement on the lakes was reduced to 21.98 per cent. The same port may be retained as an example of the second class of percentages, in which it is seen that the 3,364,067 tons of iron ore which were shipped from Escanaba constituted 98.06 per cent of the entire traffic of the port. As to the third class of percentages, Escanaba being still kept as an example, the summary will show that its relative importance in the total shipment traffic was 13.58 per cent of the total shipment.

TRAFFIC IMPORTANCE.

A still further step in the localization of the freight movement is made in the résumé, Table 9, which gives the statistics of receipts, shipments, and total movement of freight at the 107 lake and river traffic points which are embraced in the list on pages 9 and 10, entitled "Ports of assignment for statistics of traffic", and from which returns have been received. No attempt has been made to work out the percentages of all these 107 ports, both because the calculations of percentage have been made with sufficient detail in the other tables and because these additional calculations would require a far greater labor than would be commensurate with the results.

Neither are these traffic points arranged according to the lakes on which they are situated, but in an unbroken list running according to their traffic importance. Chicago, it will be seen, easily heads the list, its freight receipts having been 5,069,973 tons, and its shipments 2,914,065 tons, a total of 7,984,038 tons. Buffalo, which is next on the list, had a total freight movement of 6,730,137 tons, made up of 4,046,144 tons of receipts and 2,683,993 tons of shipments. The total traffic of Escanaba, which comes third, was 3,626,390 tons, and it is curiously made up, for while its receipts were only 195,558 tons, its shipments amounted to no less than 3,430,832 tons, which made it the greatest shipping port on the lakes. The traffic of Cleveland, which occupies the fourth place, is made up on exactly reverse grounds to that of Escanaba, for in Cleveland's case out of a total of 3,621,570 tons the shipments were but 883,862 tons, while the receipts were 2,737,708 tons. In some of the ports it will be noticed there is but 1 entry. Tonawanda, for instance, which is thirteenth on the list, appears to have been a port of receipts only, as were also Dunkirk, Waukegan, Dexter, Pultneyville, Oak Orchard, Sandy Creek, Millens Bay, Thousand Islands Park, and Youngstown, while Two Harbors, Oscoda, Peshtigo Harbor, Baraga, Pequaming, Ontonagon, Marysville, Leland, and Glen Arbor were ports of shipment only. It would be but a reproduction of the table to quote extensively from its entries, and it need only be mentioned here that the traffic figures diminish almost ton by ton until the last entry is reached, that being Youngstown, with a total traffic for the year of 75 tons.

DETAILS OF COMMODITIES.

In Table 9 the ports, as has been stated, were arranged in the order of their importance as determined by the total amount of traffic, but in the 4 tables, 10, 11, 12 and 13, in which the work of particularization is still further carried out, these 107 ports are allotted to their respective lakes, while to each port, with totals for the lakes, there are given in detail the receipts, shipments, and total movement of all commodities. In the extended division of commodities, instead of the 13 headings which were given in Table 7 and Table 8, these commodity tables give no less than 26 headings, or just double that number. Apart from the usefulness of the extensive detailed work shown in Tables 10, 11, 12 and 13, the chief point of interest in the exhibit there made, as indeed in all the tables wherein commodities are shown, is the fact that the 3 articles of coal, iron ore, and lumber comprise 75.73 per cent of the total freight movement on the lakes. If to these commodities be added corn, 82.59 per cent of the total freight tonnage is accounted for, and if to the commodities above named there be added wheat and mill products, there would only remain 10.03 per cent of the total tonnage unaccounted for. It is, then, the simplicity of the lake commerce, so far as the leading commodities are concerned, which is its chief characteristic.

The best illustration of the fact is found in Table 13, entitled "Total freight movement, by extended list of commodities". Here it is shown that the total movement of coal on all the lakes amounted to 11,268,270 tons; that the total movement of iron ore amounted to 15,303,180 tons; that the lumber movement was that of 12,205,655 tons; that the corn movement amounted to 3,513,515 tons; that the wheat movement reached 1,888,312 tons, and that of mill products amounted to 1,886,189 tons. These items represent the movement of 46,065,121 tons out of a total movement of 51,203,106 tons, leaving but a balance of 5,137,985 tons, and when from this amount is taken the 1,623,115 tons of unclassified merchandise there will remain but 3,514,870 tons to be divided among the other commodities. Between the 1,886,189 tons of mill products and the next commodity in order of importance there is indeed a great disparity of movement. The closest item is the composite one of "Other grains", of which the movement was 980,514 tons, after which the record drops to the half-million-ton standard, the commodity of salt having been

transported to the extent of 549,350 tons and that of stone to 547,229 tons. The total movement of the other commodities ran as follows:

| | TONS. |
|---|---------|
| Other iron manufactures | 320,303 |
| Iron, pig and bloom | 316,224 |
| Cement, brick, and lime | 181,462 |
| Other products of agriculture | 132,517 |
| Animal products | 123,495 |
| Sugar | 103,317 |
| Other ore than iron | 71,562 |
| Petroleum | 52,582 |
| Other manufactures | 28,735 |
| Fruit | 26,984 |
| Products of mines and quarries other than coal, stone, and salt | 23,587 |
| Ice | 18,912 |
| Hay | 18,077 |
| Liquors | 14,236 |
| Potatoes | 3,698 |
| Live stock | 2,086 |

COMMODITY MOVEMENTS.

Looking at the movement of the 6 principal items, iron ore, lumber, coal, corn, wheat, and mill products, with more regard to the limitations of traffic, it is seen in Table 13 that the largest movement in iron ore was that of receipts by the ports on Lake Erie, the figures being 6,490,518 tons out of a total for all the lakes of 15,303,180 tons, and tracing down these ports on Lake Erie in Table 10, one finds that the three great ports at which receipts of iron ore were had were Ashtabula, at which was received 2,199,109 tons; Cleveland, at which the receipts were 1,951,564 tons, and Fairport, which received 928,616 tons. Table 13 also informs us that lakes Superior and Michigan were the lakes from which the great bulk of the iron ore was shipped, the figures being: Lake Superior, 4,141,057 tons, and Lake Michigan 3,446,947 tons, the addition of which 2 amounts gives 7,588,004 tons out of a total shipment movement of 7,677,107 tons. The detailed information of Table 11 explains this matter thoroughly and shows that on Lake Superior there were 3 ports from which all its shipments of iron ore were made, these being Ashland, 1,663,021 tons; Marquette, 1,541,495 tons, and Two Harbors, 936,541 tons; while on Lake Michigan there were but 2 ports from which iron ore was shipped, these being Escanaba, to which reference has already been made, with 3,364,067 tons, and Gladstone, 82,880 tons.

The total movement of coal on all the lakes, it will be remembered, was 11,268,270 tons, made up of 5,162,471 tons receipts and 6,105,799 tons shipments. The only 2 lakes, as Table 13 shows, of which the receipts were of any consequence were Lake Michigan, where the receipts were 2,865,021 tons, and Lake Superior, where the receipts were 1,754,675 tons; while nearly the entire amount of coal shipments were made on Lake Erie, the figures being 5,196,182 tons; the next and only lake of importance as a shipping lake being Lake Ontario, on which the coal shipments were 764,355 tons. Turning back to Table 10 it will be seen that the records of the individual port receipts of coal clearly indicate the importance and extent of the industries of the respective places. The largest receipts for coal, for example, on Lake Michigan were naturally at Chicago, the figures being 1,329,364 tons, and then Milwaukee, with 907,743 tons; while on Lake Superior the great receiving points for coal were Superior, 720,000 tons, and Duluth, 485,000 tons. When it comes to shipments, however, the story is quite a different one, the main port on Lake Erie being Buffalo, the shipping point of the Pennsylvania anthracite, the figures being 2,156,670 tons. Cleveland and Toledo are also large shipping points, the shipments from the first-named port being 825,030 tons, and from the second, 650,000 tons. On Lake Ontario the great coal-shipping point was Charlotte, from which 350,000 tons were sent. In a similar way the record of all the commodities could be worked out and no better history could be furnished of the whole traffic than would result from such a study, but enough space has already been taken up in indicating how this analysis of the tables may be made and of the lessons which would result from such an analysis.

A DIVERSITY OF ITEMS.

It was stated on page 14 that "the simplicity of the lake commerce, so far as the leading commodities are concerned, is its chief characteristic", but it must not be inferred, however, that because of the preponderance of three or four commodities the commerce of the lakes is not a diversified one. The contrary is, indeed, the case, as may be seen by the following lengthy list of commodities which are included in the 5 divisions of "Products of agriculture", "Products of mines and quarries", "Other products", "Manufactures", and "Unclassified":

Products of agriculture:

Wheat includes all wheat.

Corn includes green corn.

Other grains include barley, buckwheat, oats, rye, and rice.

Mill products include bran, corn meal, flour, ground feed, mill stuffs, malt, middlings, oatmeal, and oil cake.

Fruit includes all kinds of fruit.

Other farm products include onions, straw, butter, cheese, eggs, peas, broom corn, vegetables, cider, seeds, cotton, and tobacco.

Products of mines and quarries:

Other ore includes copper ore and spelter.

Stone includes limestone, sandstone, paving stone, grindstone, building stone, marble, and sand.

Other mine products, not specified, include bullion, mica, plaster, and sulphur.

Other products:

Animal products include beef, cured meats, hides and skins, pork, leather, lard, tallow, wool, and poultry.

Live stock includes hogs, horses, cattle, and sheep.

Lumber, all kinds, includes car sills, Georgia pine, hoops, hoop poles, heading, matchwood, moldings, piles, posts, pickets, slabs, staves, bolts, ties, wood, lath, and shingles.

Manufactures:

Petroleum includes other oils.

Other iron manufactures include castings, bolts, railroad iron, nails, stoves, steel, spikes, machinery, bar and sheet metal, and rails.

Liquors include spirituous and malt liquors of all kinds and alcohol.

Other manufactures, not specified, include acid, ammonia, alum, bottles, bags, baskets, crockery, fertilizer, furniture, earthenware, lead, wagons, mantels, paints, pianos and organs, paper, trunks, pipes, jars, and twine binders.

Unclassified:

Merchandise and other commodities include ashes, empty barrels, bark, empty cases, household goods, fish poles, scrap iron, junk, empty kegs, mineral water, oakum, pulp, rags, sulphite, fiber, canned goods, coffee, candles, chestnuts, drugs, fish, groceries, glass, glucose, sirup, explosives, mill merchandise, rope, starch, soap, toys, tea, varnish, vinegar, sawdust, and sundries.

UNCLASSIFIED COMMODITIES.

The 25,936,132 tons of received freight and the 25,266,974 tons of shipped freight, which have been given in traffic tables 7 to 13, inclusive, do not really include all the freight for which returns even have been made, but only that amount which could be accurately reduced to the uniform unit of a 2,000-pound ton. A very large amount of freight was reported on which no such accurate reduction could be made, these returns being set down in Table 14. Among the much diversified commodities which are given in this table are household goods, window sashes, pianos, empty cases, thrashing machines, and home and farm utensils and machinery of many descriptions. The principal item, however, was that of merchandise waybilled as "packages", of which packages there were no fewer than 8,937,402.

These unclassified commodities represented so large a freight tonnage that an estimate of their freight in tons has been made. That attempt is set down in Table 15, wherein is shown the unit of measurement or description, the estimated weight in pounds per unit, and the estimated result in tons of all these much diversified goods, the result being an addition of 460,777.23 tons to the figures which stand as the totals of the general traffic tables.

CARGO TONNAGE.

While in all these tables the receipts, shipments, and total movement of freight have been quoted as representing the traffic on the Great Lakes and St. Lawrence river, it must be observed that it is a problem in accurate statistics whether the aggregate of receipts and shipments does not show a larger movement than the actual returns of cargo tonnage would do. In Table 16 the principle has been followed that the volume of traffic would be more clearly measured, not by this aggregate of receipts and shipments for all ports, but rather by taking in the case of each commodity either receipts or shipments, whichever happened to be the larger, and using this single amount to represent the cargo tonnage of that commodity. The totals of this table are drawn from Table 8.

PASSENGER RETURNS.

The last of the traffic tables, Table 17, furnishes the figures showing the passenger movement on these waters. From the returns there shown it appears that 775,871 persons traveled on regular passenger or regular passenger and freight boats; that 836,648 excursion passengers were reported on, and that there were 623,474 ferry

passengers, making a total of 2,235,993 passengers. A consideration of these totals is postponed until the subject of comparative statistics is taken up. It will be enough to say here that nearly one-half of the excursion passengers is credited to Lake Erie, on which lake there seems to have been moved a total of 369,924 excursionists, and that Toledo was the great excursion point, no fewer than 257,046 being the number set down. The lake on which the greatest regular passenger business is reported to have been conducted is Lake Huron, which gives 315,120 out of a total of 775,871. The figures of passenger traffic are interesting so far as they go, but it must be confessed that the returns were not made with that scrupulous care which characterized the schedule reports of traffic and equipment.

FREIGHT VALUES.

Information regarding the value of the freight moved in any locality or on any particular water system has been so often asked for since commencing the preparation of these statistics that a calculation has been effected, in the case of the lake traffic, to secure an estimate of such valuation. This has been moderately practicable, as will be seen in Table 18, because of the record of estimated value kept at the offices of the St. Marys Falls canal, as will be hereafter shown in Table N inserted in the body of the present text. These estimates, which were prepared with much care by General O. M. Poe, United States Army Corps of Engineers, cover most of the principal commodities, and by applying them to the commodity tables of the lake traffic it has been found that the 27,394,767 tons constituting the total of the cargo tonnage shown in Table 16 had a value of \$359,482,437, while the addition of the 248,820 tons of unweighed freight, which has been estimated as the proper "cargo tonnage" of the 460,777 tons given in Table 15, will, at an estimate of \$60 per ton, raise the total value to \$374,411,637. The average estimated value per ton of all commodities, it will be seen, was \$13.12, while the range in the estimated values of commodities ran from \$3.05, for iron ore, to \$155.38 for "other products of mines and quarries". The next highest estimated value of any commodity is that of \$100 per ton, for "animal products". The valuation of some one or two other commodities, it will be observed, runs up into very high figures. The lead is taken by lumber, the 6,857,257 tons which were moved during 1889 being set down as worth \$70,629,747. Next come the mill products, valued at \$49,603,300, and then the wheat, \$31,662,131. The coal moved is valued at \$21,370,297 and the iron ore at \$23,415,176. The claim is not made that these estimates of values are unfailingly exact, but it is believed that they come comparatively close to the actual facts.

EARNINGS AND EXPENSES.

In Table 19 the figures are given which show how the business of transportation by water paid during 1889 for the 1,841 reporting craft. These figures are furnished under the headings of gross earnings, expenses, and net earnings, and all are given for the steam, the sailing, and the unriggered fleets allotted to their ports of registration, with totalized earnings for the lakes, and a summary in which a balance sheet is struck for all classes of craft; while in a supplementary table an estimate is made of the earnings and expenses of the 896 craft not reporting these matters. The summary's figures indicate that the gross earnings of the reporting fleet amounted to \$24,369,895, the expenses to \$19,443,241, leaving the net earnings at \$4,926,654. The largest figures out of this total are for Lake Erie, the gross earnings of its reporting fleet standing at \$9,649,090, with expenses of \$7,621,541, and net earnings of \$2,027,549. The next largest account is that of Lake Huron's fleet, which earned \$6,955,133, which paid out \$5,349,465 for expenses, and made as net earnings \$1,605,668. The third lake fleet in the order of its earnings and expense account was that of Lake Michigan, where the gross earnings were \$5,826,148, the expenses \$4,843,159, and the net earnings \$982,989. So far as ports are concerned, the largest gross earnings were those made by Cleveland's fleet, the figures being \$4,344,697 and the expenses \$3,441,929, leaving the net earnings at \$902,768. The next port in the order of its fleet operations so far as reported was Detroit, the amount being \$3,792,600, with \$2,812,931 for expenses and \$979,669 as net earnings. The third port of importance in this regard was Port Huron, its fleet returns giving \$3,162,533 of gross earnings, \$2,536,534 of expenses, and \$625,999 of net earnings. The gross earnings of Buffalo's fleet were \$2,785,853; those of Milwaukee were \$2,398,306; those of Chicago were \$2,111,312; those of Grand Haven were \$1,316,530, and those of Marquette were \$1,105,405; the earnings of each of the other places being below \$1,000,000.

Out of the totals of the combined fleets the earnings of all the reporting lake steamers amounted to \$17,808,329, the expenses to \$13,861,485, and the net earnings to \$3,946,844. Lake Erie maintains its importance in the returns of the steamers' accounts just as it did in the returns of the entire fleet, the steamers' gross earnings being \$7,461,563, their expenses \$5,732,426, and their net earnings \$1,729,137. Cleveland also retains its relative port importance, the gross earnings of its steamers being \$3,215,855, the expenses \$2,449,910, leaving the net earnings at \$765,945. These net earnings, however, were not so large as those of Detroit's steamers, the sum in that case being \$815,357 out of a total gross earnings of \$2,945,129. Next to Detroit came Buffalo, the gross earnings of its steamers being \$2,368,184 and their expenses \$1,834,458, leaving the net earnings at \$533,726.

The gross earnings of the entire reporting sailing fleet for all the lakes were \$6,480,424, the expenses \$5,513,536, and the net earnings \$966,888. The same lakes and ports that have been enumerated as controlling the most important financial figures in the reported operations of their entire sailing and steam fleets retained their leading position in the same details of the sailing vessels, and it will be scarcely necessary to quote any figures in evidence.

The earnings of the unriggered amounted to \$81,142, the expenses to \$68,220, and the net earnings to \$12,922. Only 3 ports, it will be observed, made any return for the unriggered, these being Marquette, Buffalo, and Ogdensburg. The unriggered account is in fact not altogether satisfactory, the two great difficulties in securing reports being that the most of the unriggered were mainly employed on the canals opening onto the lakes and their operations have been, whenever possible, covered in the report on canals; and, in the next place, the expense account of the unriggered was in many cases included in the accounts of the steamers supplying the motive power.

The supplementary table for the 896 craft not reporting earnings and expenses shows the estimate of gross earnings to be \$11,093,957, that of expenses \$8,448,811, leaving the net earnings at \$2,645,146, and these figures added to those of the craft actually reporting would raise the probable gross earnings of the whole operating fleet of the Great Lakes to \$35,463,852, the expenses to \$27,892,052 and the net earnings to \$7,571,800.

EXPENSE DETAILS.

In Table 20 the total amount of reported expenses, \$19,443,241, is reduced to the principal items making it up. These items are port charges, wages, provisions, current repairs, fuel (for the steamers), commissions, insurance, taxes, and office expenses, together with the two entries giving what other running and shore expenses may not have been included in the list of items just quoted. These items of expenses are distributed among the steam, sail, and unriggered craft of each port of registration, with totals for the lakes and a summarized presentation of the same items of expenses for all the fleets. Many interesting lessons are to be learned from a consideration of these analyses of expenses. By far the largest item was that of wages, the figures being \$5,676,802, of which amount \$4,235,980 were paid on board the steamers and \$1,422,957 on board the sailing vessels. Out of the total wages Cleveland paid \$652,146 to steamer hands and \$223,576 to the crews of sailing vessels, while Detroit shipowners paid out \$626,589 to the officers and crews of steamers and \$139,746 for wages on board sailing vessels. The wage account of the Buffalo steamers footed up to \$533,468, that of its sailing vessels reaching only \$70,424, while the steamer wages at Port Huron amounted to \$479,292 and the sailing vessel wages to \$230,201.

The next largest item of expense was that of fuel, the cost of which amounted to \$2,975,915. Current repairs cost \$1,681,694, \$1,158,494 being expended on steamers and \$522,557 on sailing vessels. Provisions cost \$1,322,925, the steamers' portion of that expense being \$990,678 and the sailing vessels' part being \$328,207; port charges for the fleets for all the lakes amounted to \$895,140, close to which stands the item of insurance, \$885,303. The commissions amounted to \$158,863, taxes to \$138,773, and the office expenses to \$235,085. There is material in Table 20 for many calculations which would be of especial interest to shippers, such, for example, as the relation of certain items of expense to certain classes of vessels in different localities, together with others which will suggest themselves to the practical reader.

The supplementary table for the 896 craft not reporting details of expenses gives a very interesting analysis in estimate of the \$8,448,811 which form the total estimated expenses of the nonreporting contingent of the lake fleet, and by adding these estimates to the figures actually given the probable totals in the items of port charges, wages, provisions, current repairs, fuel, commissions, insurance, taxes, and other running and shore expenses will be obtained.

EMPLOYÉS AND WAGES.

In much the same way that the grand total of expenses given in Table 19 was divided into a number of items in Table 20, so the grand total of wages which formed one of the leading items in Table 20 is analyzed in Tables 21 and 22, which treat of the monthly wages of all classes of employés. Of these employés the steamer list embraces captains, first and second mates, clerks, first and second engineers, wheelmen, lookouts, watchmen, cooks and assistant cooks, seamen, deck hands, firemen, stewards, waiters, boys, chambermaids, porters, and musicians; the sailing vessel list embraces captains, first and second mates, cooks, seamen, boys, and watchmen; and the unriggered craft list includes captains, mates, cooks, and seamen. The number of each class of employés for all fleets is given by ports, lakes, and in a comprehensive total. From this latter it is seen that on all the lakes the list of employés, their number, aggregate monthly payments, and the average monthly wages for the 1,841 reporting craft were as given in Table C, on the following page.

TABLE C.—STATEMENT SHOWING THE NUMBER OF ALL EMPLOYÉS CONSTITUTING THE ORDINARY CREWS OF 1,841 REPORTING VESSELS ON THE GREAT LAKES AND ST. LAWRENCE RIVER, TOGETHER WITH THEIR AGGREGATE AND AVERAGE MONTHLY WAGES.

| EMPLOYÉS. | Number employed. | Aggregate of wages for one month. | Average monthly wages. |
|-----------------------|------------------|-----------------------------------|------------------------|
| Total | 15,761 | \$769,047 | \$48.79 |
| Captains..... | 1,837 | 175,799 | 95.70 |
| First mates..... | 1,214 | 74,471 | 61.34 |
| Second mates..... | 471 | 26,304 | 55.85 |
| Clerks..... | 117 | 7,751 | 66.25 |
| First engineers..... | 1,067 | 92,193 | 87.34 |
| Second engineers..... | 597 | 37,150 | 62.24 |
| Wheelmen..... | 1,040 | 37,452 | 36.01 |
| Lookouts..... | 565 | 19,078 | 33.77 |
| Watchmen..... | 505 | 16,633 | 32.94 |
| Cooks..... | 1,387 | 60,794 | 43.83 |
| Assistant cooks..... | 306 | 6,419 | 20.98 |
| Seamen..... | 2,444 | 93,255 | 38.16 |
| Deck hands..... | 2,278 | 53,992 | 23.70 |
| Firemen..... | 1,463 | 53,411 | 36.51 |
| Stewards..... | 75 | 4,457 | 59.43 |
| Waiters..... | 215 | 4,395 | 20.44 |
| Boys..... | 34 | 622 | 18.20 |
| Chambermaids..... | 49 | 1,097 | 22.39 |
| Porters..... | 89 | 2,245 | 25.22 |
| Musicians..... | 8 | 520 | 65.00 |

In explanation of the apparently high wages paid in the business of the lake traffic, which the preceding and succeeding tables show, attention should be called to the fact that the season of employment on the Great Lakes never includes the winter months, and, that, therefore, any computation of annual wages can only be based upon the 7 or 8, or, at the most, 9 months of open water. From summary Table C it is also seen that the number of persons making up the ordinary crews of the 1,841 reporting vessels was 15,761, of which number (see Table 22) 832 belonged to Lake Superior, 4,278 to Lake Huron, 4,503 to Lake Michigan, 5,430 to Lake Erie, 476 to Lake Ontario, and 242 to St. Lawrence river. The number of persons who received employment on these vessels during the year, however, was much larger, the total being 28,295, of which total 1,469 belonged to Lake Superior, 6,853 to Lake Huron, 8,474 to Lake Michigan, 10,298 to Lake Erie, 615 to Lake Ontario, and 586 to St. Lawrence river. The total monthly account of the wages paid to the officers and crews given in the foregoing statement stands at \$769,047, of which amount \$43,514 were paid to officers and crews on Lake Superior, \$195,894 to those on Lake Huron, \$233,630 to those on Lake Michigan, \$264,083 to those on Lake Erie, \$21,849 to those on Lake Ontario, and \$10,077 to those on the St. Lawrence river. The average rate of wages has also been worked out in all of these tables, and when they are calculated from the lake totals it is remarkable how little variation appears. The highest average rate of wages per month for the whole body of reported employés making up ordinary crew is \$52.30 for Lake Superior, while the lowest is \$41.64 on St. Lawrence river, between which come \$51.88 for Lake Michigan's average, \$48.63 as that of Lake Erie, \$45.90 as that of Lake Ontario's employés, and \$45.79 as that of the Lake Huron contingent, the average for the whole system of lakes being \$48.79, which is, as it will be observed, very close to that of Lake Erie's average.

STATISTICS OF TRANSPORTATION.

So far as the list of the steamer crews is concerned, with their numbers, class, and aggregate monthly wages, the figures are as follows:

TABLE D.—STATEMENT SHOWING THE NUMBER OF ALL EMPLOYEES CONSTITUTING THE ORDINARY CREWS OF 1,072 REPORTING STEAMERS ON THE GREAT LAKES AND ST. LAWRENCE RIVER, TOGETHER WITH THEIR AGGREGATE AND AVERAGE MONTHLY WAGES.

| EMPLOYEES. | Number employed. | Aggregate of wages for one month. | Average monthly wages. |
|------------------------|------------------|-----------------------------------|------------------------|
| Total | 11,159 | \$554,907 | \$49.73 |
| Captains | 1,069 | 116,078 | 109.15 |
| First mates | 577 | 41,289 | 71.56 |
| Second mates | 339 | 19,663 | 58.00 |
| Clerks | 117 | 7,751 | 66.25 |
| First engineers | 1,067 | 93,193 | 87.34 |
| Second engineers | 597 | 37,159 | 62.24 |
| Wheelmen | 1,040 | 37,452 | 36.01 |
| Lookouts | 565 | 19,078 | 33.77 |
| Watchmen | 503 | 16,583 | 32.97 |
| Cooks | 720 | 37,106 | 51.54 |
| Assistant cooks | 306 | 6,419 | 20.98 |
| Seamen | 52 | 1,870 | 35.96 |
| Deck hands | 2,278 | 53,992 | 23.70 |
| Firemen | 1,463 | 53,411 | 36.51 |
| Stewards | 75 | 4,457 | 59.43 |
| Waiters | 215 | 4,395 | 20.44 |
| Boys | 30 | 549 | 18.30 |
| Chambermaids | 49 | 1,097 | 22.39 |
| Porters | 89 | 2,245 | 25.22 |
| Musicians | 8 | 520 | 65.00 |

Allotted to the lake and river steamer fleets, the monthly wage list for these steamers (with the average rate of wages per month) stands as follows:

| LAKES AND RIVER. | Total wages paid per month. | Average rate of wages per month. |
|--------------------------|-----------------------------|----------------------------------|
| Total | \$554,907 | \$49.73 |
| Lake Superior | 36,479 | 52.79 |
| Lake Huron | 144,608 | 48.01 |
| Lake Michigan | 148,397 | 52.75 |
| Lake Erie | 204,532 | 48.72 |
| Lake Ontario | 12,402 | 46.80 |
| St. Lawrence river | 8,489 | 47.16 |

The crews of the sailing vessels, with their monthly wage account, are shown in the following list:

TABLE E.—STATEMENT SHOWING THE NUMBER OF ALL EMPLOYEES CONSTITUTING THE ORDINARY CREWS OF 758 REPORTING SAILING VESSELS ON THE GREAT LAKES AND ST. LAWRENCE RIVER, TOGETHER WITH THEIR AGGREGATE AND AVERAGE MONTHLY WAGES.

| EMPLOYEES. | Number employed. | Aggregate of wages for one month. | Average monthly wages. |
|--------------------|------------------|-----------------------------------|------------------------|
| Total | 4,541 | \$212,058 | \$46.70 |
| Captains | 757 | 58,426 | 77.18 |
| First mates | 632 | 32,952 | 52.14 |
| Second mates | 132 | 6,641 | 50.31 |
| Cooks | 660 | 23,547 | 35.68 |
| Seamen | 2,354 | 90,369 | 38.39 |
| Boys | 4 | 73 | 18.25 |
| Watchmen | 2 | 50 | 25.00 |

Allotted to the lake and river sailing vessel fleets, the monthly wage list (with the average rate of wages per month) would be as follows:

| LAKES AND RIVER. | Total wages paid per month. | Average rate of wages per month. |
|--------------------------|-----------------------------|----------------------------------|
| Total | \$212, 058 | \$46. 70 |
| Lake Superior | 6, 069 | 40. 77 |
| Lake Huron | 51, 286 | 40. 51 |
| Lake Michigan | 85, 233 | 50. 43 |
| Lake Erie | 58, 876 | 48. 34 |
| Lake Ontario | 9, 447 | 44. 77 |
| St. Lawrence river | 547 | 24. 86 |

The items of the wage account of the crews belonging to reporting unrigged craft may be summarized as follows:

| EMPLOYÉS. | Number employed. | Aggregate of wages for one month. | Average monthly wages. |
|----------------|------------------|-----------------------------------|------------------------|
| Total | 61 | \$2, 082 | \$34. 13 |
| Captains | 11 | 695 | 63. 18 |
| Mates | 5 | 230 | 46. 00 |
| Cooks | 7 | 141 | 20. 14 |
| Seamen | 38 | 1, 016 | 26. 74 |

The supplementary statement for the 896 craft not reporting crews and wages shows the estimated number of men on these vessels to be 6,965, to whom, on the basis of the rates reported on, there were paid \$317,138 as the aggregate of wages for 1 month. Accepting the sum of these 2 tables as the probable account of crews and wages for all the operating lake fleets, it would seem that the total number employed was 22,726, their aggregate wages for 1 month being \$1,086,185.

FUEL ACCOUNT.

An itemization has been made of the fuel account in Table 23, wherein are set down the accounts of coal and wood burned by the 1,072 reporting steamers during the operating year of 1889, together with the cost of the fuel. As was seen when considering Table 20, the cost of the fuel figured as an item of the expense account to the extent of \$2,975,915. The material costing this consisted of 1,118,677 tons of coal and 62,319 cords of wood. The greatest reported consumption of coal was on Lake Erie, where 497,268 tons were burned, costing \$1,333,833; on Lake Huron 324,209 tons were burned, costing \$745,130, and on Lake Michigan 205,591 tons of coal were burned. Wood was only reported as having been burned to any extent on Lake Michigan, where 60,843 cords were used; the other two localities reporting the consumption of wood for fuel being Lake Superior, with 1,100 cords, and St. Lawrence river, with 376 cords.

The supplementary report for the 395 steamers not reporting fuel gives an estimate of 412,320 tons of coal and 22,969 cords of wood burned, valued at \$1,096,536; which figures added to those actually reported give a total fuel account of 1,530,997 tons of coal and 85,288 cords of wood, the whole valued at \$4,072,451.

COMPARATIVE STATISTICS.

In considering the comparative statistics embraced in Tables 24 to 32, inclusive, it must be remembered that the figures are drawn from two different sources, according to the condition of the data. Thus the first 4 tables are made up from the information which was presented in the transportation volume of the Tenth Census compared with such totals drawn from the report of the present census as could be presented in exact juxtaposition. The only branch of transportation on the Great Lakes which the report of the Tenth Census touched upon was that conducted by steamers, so that the tabulation of comparative statistics based on the census figures was necessarily restricted to the operations of this class of craft, and to such entries of equipment, operations, and expenses as formed the subject of the inquiry by both the Tenth and Eleventh Censuses.

In this connection the following extract from the report on transportation by the Tenth Census may be pertinently quoted:

THE LAKES IN 1880.

On the northern lakes, embracing the steamboat interests of states and parts of states tributary to these waters, but excluding Lake Champlain, there were at the close of the census year 947 steamers of all classes, measuring 222,290.45 tons, valued at \$13,918,925, with \$16,978,108 of capital invested. They gave employment to 9,143 men, and there were paid for services \$3,293,964, making an average of \$360.27 per man, exclusive of shore help. The passenger movement, amounting to 1,356,010 persons carried, may be divided

into 926,250 regular and excursion passengers and 429,760 ferry passengers, not including the transfers of the Canada Southern Bridge Company at Stony Island, near Detroit, with one of their boats an American bottom. The freight movement reached 4,368,171 tons, exclusive of lumber carried, which approximated 318,889,000 feet. The lumber that was towed during some stage in its journey from the forest and mill to the manufactory would include a large share of the 4,497,211,000 feet cut on the upper and lower peninsula of Michigan, as well as a large portion of the lumber production of Wisconsin. * * * Employed in this line of traffic there were some 70 steamers, measuring 23,300.84 tons, and valued at \$1,302,500, engaged in carrying this production. In the grain trade the number of steamers approximated 67, measuring 80,669.12 tons, and valued at \$4,777,700, and in the ore trade there were some 38 steamers, measuring 36,145.93 tons and valued at \$1,750,500. * * *

The fuel consumed by the steamers on the northern lakes was reported at 488,610 tons of coal and 255,629 cords of wood, the latter consisting largely of slabs and poor grades of wood and refuse used in the towing steamers in the lumber regions of Michigan and Wisconsin. The coal consumed was largely of the bituminous variety, mined in southern and central Ohio. * * *

Of the 947 steamers owned on the northern lakes, 141 were passenger steamers, measuring 56,471.26 tons and averaging 400.50 tons each; 28 ferry steamers, measuring 3,624.26 tons and averaging 129.43 tons each; 202 freight steamers, measuring 139,154.16 tons and averaging 688.88 tons; 426 towing steamers, of 20,274.95 tons, with an average of 47.59 tons; and 150 yachts, measuring 2,765.82 tons and averaging 18.44 tons. In 1851 the average tonnage of steamers on the northern lakes was given at 437 tons. The increase in the number of tugs and yachts since that date has reduced their average to 235 tons at the present time. The maximum tonnage in 1880 was 2,082 tons, while the maximum of actual carrying capacity was about 2,400 tons.

LESSONS OF COMPARISON.

So far as Table 24 goes, it might form the basis of much interesting speculation, but all that it is necessary to indicate at present is the fact that in 1880 the lake fleet of steamers numbered 947, with a tonnage of 222,290 tons and an estimated commercial value of \$13,918,925, and that in 1889 the lake fleet of steamers numbered 1,467, had a tonnage of 595,013 tons, and was valued at \$40,868,824. The classification of the fleets for both years has been made by passenger and freight carrying boats, ferryboats, towing and harbor boats, and miscellaneous craft. In all of these classes, with the exception of the miscellaneous, it will be observed there has been a steady and well-defined increase, and the only reason that this is not marked in the miscellaneous class is because in the entry of 1880 there were included a number of steam canal boats that were omitted from that of 1890. It has been said that the increase in the 2 years of report is a steady and well-defined one, but it will be observed that there is an apparent lack of ratio between the number of the passenger and freight boats on the one hand and the increase of their tonnage and value on the other, for while the increase in the number of the steamers is at the rate of 132.65 per cent, the increase in the tonnage stands at 186.34 per cent, and that of value at 228.87 per cent. The explanation of the apparently undue increase in tonnage and value lies in the fact that the passenger and freight steamers which are being turned out from the lake shipyards are yearly becoming larger and more expensive, a subject concerning which much more is said under the head of "Comparative record of shipbuilding".

EARNINGS AND WAGES.

Only the gross earnings are given in Table 25, because in the investigation of 1880 only these were asked for, and it was not possible to make up a balance sheet owing to the absence of any figures of expenses, and only the total for all the lakes is published because of the fact that in 1880 the returns were made by states, while in 1889 they were made by lakes. This unfortunately does away with the possibility of a comparison by localities, and all that can be shown or said is that in 1880 the gross earnings on all the reporting craft of the Great Lakes amounted to \$12,136,228, while in 1889 the sum had risen to \$17,808,329, a gross increase of \$5,672,101 and an average annual increase of more than \$630,000. The amount paid out in wages on reporting vessels in the 2 years is given in Table 25, because it is the only item of expense that can be compared, but a better consideration of it may be had from a study of Table 26. The entry entitled "Total number of men making up the ordinary crews" must be accepted as indicating the total number of men required to work all the reporting craft, and not the total number of men employed during the year. The number of men making up the complement of the crews on reporting vessels in 1880 was 9,143, while in 1889 the number reported was 11,159. To these there was paid out as wages during 1880 \$3,293,964, while in 1889 the total wages paid amounted to \$4,235,980. The average annual wages per man for the first-mentioned year was \$360.27, and \$379.60 for 1889, an average increase of wages per man of \$19.33.

FREIGHT AND PASSENGER TRAFFIC.

The explanation of the abnormal increase of freight movement for 1889 over that of 1880, as given in Table 27, is a twofold one. In the first place the increase of steamers as freight carrying vessels has been unusually large, the fleet of 1889 (as it will be remembered was shown in Table 24) being more than 100 per cent greater than it was in 1880, while the tonnage had just about trebled. This means that the increase of steamer carried freight would be the largest of any portion of the lake traffic, and if the tonnage of the fleet has increased threefold there is no good reason why the freight movement might not have been increased in the same ratio. The figures of freight movement as given in Table 27, however (4,368,171 tons in 1880 and 20,143,483 tons in 1889), show a more than quadruple increase, and the other part of the explanation is that the means employed to secure a full report in 1889 were further reaching than those which could be availed of in 1880. The increase in passenger movement, it

will be observed, while it does not show any such extraordinary accretion, is still a large one, the total movement for 1880 standing at 1,356,010 passengers against 2,235,993 in 1889. These totals were made up of 926,250 regular and excursion passengers and 429,760 ferry passengers carried in 1880 and 1,612,519 regular and excursion and 623,474 ferry passengers carried in 1889.

FLEETS IN 1880 AND 1889.

The comparative statistics found in Table 28 and the 5 following tables have been gathered from the reports of the bureau of navigation. It will be noticed that although the total of the fleet for 1889 is the same in both the reports of the Commissioner of Navigation and the Census, the component parts do not correspond. The two reports stand as follows:

| EQUIPMENT. | Census report. | Report of Commissioner of Navigation. |
|----------------------|----------------|---------------------------------------|
| Total | 2,737 | 2,737 |
| Steamers | 1,467 | 1,436 |
| Sailing vessels..... | 962 | 1,251 |
| Unrigged | 308 | 50 |

The only difference between these two lists is that of the distribution of the unrigged. If the Commissioner's 50 barges are subtracted from the census 308 unrigged, 258 unrigged will remain to be distributed among the steamers and sailing vessels. Next it will be seen that the census report gives 1,467 steamers, while the Commissioner's is 1,436, which means that the census has grouped 31 more craft under the head of steamers than the Commissioner has done. Adding the extra number of unrigged, 258, to the 31 surplus steamers, a total of 289 is reached, which is exactly the number of sailing vessels required to raise the census 962 to the Commissioner's 1,251. The yearly details afforded in Tables 28, 29, and 30 form an interesting record, but the pith of the subject is found in the recapitulation of the 10 years, wherein the addition of the individual records of the various districts is inserted, the total representing the lake fleet for each of the years in question. No clearer presentation of the gradual change in the class of craft in use on the lakes can be made than is found in this recapitulation, for while the number and tonnage of the entire fleet has risen from 2,487 craft with an aggregate tonnage of 552,342 tons in 1880 to 2,737 craft with an aggregate tonnage of 900,847 tons in 1889, it will be seen that the increase has been made only in the steamer fleet, and that there has been a steady diminution in both the sailing vessels and barges registered in the various ports. The sailing vessels, which numbered 1,415 in 1880, had dropped to 1,332 in 1883 and to 1,251 in 1889. While, however, the number had thus dwindled, the tonnage, it will be seen, displayed an increase, for, although it was 302,265 tons in 1880, it had risen to 322,694 tons in 1889, notwithstanding the fact that the number had decreased. The explanation, of course, lies in the circumstance already alluded to, the increased average tonnage of the vessels built in late years. In the case of the barges, however, the diminution has been a steady one in both number and tonnage. In 1880 the number of registered barges was 160, with a tonnage of 40,612 tons; by 1884 it had dropped to 120, with a tonnage of 33,326 tons, while by 1889 the number had decreased to 50 and the tonnage to 6,948 tons.

SHIPBUILDING RECORDS.

Tables 31 and 32 form a record of shipbuilding for the same 10 years, 1880-1889, that have been used in the 3 preceding tables. Table 31 gives the figures from the yards of each customs district and for the construction of steamers, sailing vessels, and barges; while Table 32 deals only with the steamers built during each of the 10 years, and then considers them under the various methods of propulsion, that is, whether propeller, side-wheel, or stern-wheel. Each table is supplemented by a recapitulation, in which only the totals for the whole lake system are inserted:

STATISTICS OF TRANSPORTATION.

A study of Table 31 shows that if arranged in the order of their importance as shipbuilding centers, the different customs districts would stand as is shown in the following table:

TABLE F.—STATEMENT SHOWING THE TOTAL NUMBER OF REGISTERED VESSELS OF ALL CLASSES BUILT IN THE CUSTOMS DISTRICTS OF THE GREAT LAKES AND RIVER ST. LAWRENCE DURING THE YEARS 1880-1889, THE DISTRICTS BEING ARRANGED IN THE ORDER OF THEIR IMPORTANCE.

| CUSTOMS DISTRICTS. | Total. | 1880. | 1881. | 1882. | 1883. | 1884. | 1885. | 1886. | 1887. | 1888. | 1889. |
|---------------------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Total | 1,375 | 117 | 175 | 199 | 134 | 110 | 95 | 66 | 117 | 183 | 179 |
| Huron | 245 | 21 | 30 | 36 | 24 | 19 | 14 | 9 | 22 | 31 | 39 |
| Michigan | 206 | 23 | 23 | 35 | 20 | 18 | 11 | 13 | 18 | 17 | 28 |
| Milwaukee | 182 | 16 | 23 | 28 | 21 | 8 | 15 | 6 | 7 | 30 | 28 |
| Buffalo creek | 180 | 9 | 31 | 23 | 22 | 20 | 8 | 10 | 14 | 23 | 20 |
| Detroit | 156 | 21 | 24 | 23 | 11 | 15 | 9 | 3 | 11 | 19 | 20 |
| Cuyahoga | 123 | 9 | 14 | 18 | 8 | 7 | 4 | 5 | 12 | 23 | 23 |
| Chicago | 64 | 1 | 6 | 15 | 12 | 5 | 8 | 3 | 9 | 3 | 2 |
| Cape Vincent | 41 | 5 | 4 | 3 | 3 | 2 | 10 | 2 | 2 | 6 | 4 |
| Sandusky | 29 | 3 | 3 | 5 | 1 | 2 | 3 | 5 | ..... | 5 | 2 |
| Superior | 28 | ..... | 5 | 4 | 3 | 3 | 1 | 2 | 2 | 5 | 3 |
| Oswego | 25 | 3 | 6 | 1 | 3 | 1 | ..... | 1 | 4 | 5 | 1 |
| Niagara | 23 | 2 | ..... | 3 | ..... | 1 | 1 | ..... | 8 | 7 | 1 |
| Oswegatchie | 20 | 1 | 1 | 1 | 1 | 4 | 5 | 3 | ..... | 3 | 1 |
| Miami | 19 | 2 | 3 | ..... | 4 | 2 | 1 | ..... | ..... | 2 | 5 |
| Erie | 14 | ..... | ..... | 4 | ..... | ..... | 3 | 1 | 1 | 3 | 2 |
| Genesee | 11 | 1 | 2 | ..... | ..... | 1 | ..... | 2 | 5 | ..... | ..... |
| Duluth | 7 | ..... | ..... | ..... | 1 | 2 | 2 | 1 | ..... | 1 | ..... |
| Dunkirk | 2 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 2 | ..... | ..... |

From the preceding summary it is seen that the districts of Huron, Michigan, Milwaukee, Buffalo, Detroit, and Cuyahoga (Cleveland) easily lead. It will be seen, too, that with Detroit as the exception of locality and with the years 1882, 1884, 1885, and 1886 as the exceptions of time, the increase in the shipbuilding records of these leading districts has been a steady one. Contrasting the figures of 1880 and 1889, Huron, for instance, is seen to have gained 18 in her output of vessels, Michigan to have gained 5, Milwaukee 12, Buffalo 11, and Cuyahoga 14. Chicago's shipbuilding record is surprisingly small, and it is only during the past year or two that this city has seriously taken up the industry of construction. The largest record of any one district for any one year in point of number was for Huron, in 1889, when she added 29 steamers of 20,980 tons burden, 9 sailing vessels of 4,306 tons burden, and 1 barge with 174 tons burden to the lake fleet, the total addition being 39 craft, with a tonnage of 25,459 tons. The largest record of any one district for any one year, in point of tonnage, was that of Cuyahoga, in 1889, when she built 23 vessels, with an aggregate tonnage of 31,205 tons, making an average tonnage of 1,357 tons.

To Cuyahoga's shipyards for 1888 must also be credited the second best year's output, the aggregate tonnage of 23 vessels launched in that year rising to 29,786 tons. Next in the order of the year's shipbuilding comes Huron, in 1889, when from the yards of that district there were launched 39 vessels, with a tonnage of 25,459 tons, and next Detroit, for 1889, when 20 vessels were built, with an aggregate tonnage of 22,426 tons. Taking the three years of 1887, 1888, and 1889, it will be seen that during this term shipbuilding on the Great Lakes reached its highest point, the record, as is shown by the subjoined table, being 200 vessels launched, with an aggregate tonnage of 192,281 tons.

TABLE G.—STATEMENT SHOWING THE OUTPUT OF THE THREE LEADING SHIPBUILDING DISTRICTS ON THE GREAT LAKES FOR 3 SELECTED YEARS, TOGETHER WITH THE AVERAGE TONNAGE OF THE VESSELS AND FLEETS.

| CUSTOMS DISTRICTS. | Year. | Tonnage. | Number of vessels. | Average tonnage. |
|----------------------------|-------|----------|--------------------|------------------|
| Total for 3 districts..... | | 192,281 | 200 | 961 |
| Cuyahoga..... | 1887 | 16,351 | 12 | 1,363 |
| | 1888 | 29,786 | 23 | 1,295 |
| | 1889 | 31,205 | 23 | 1,357 |
| Total for Cuyahoga..... | | 77,342 | 58 | 1,333 |
| Detroit..... | 1887 | 10,554 | 11 | 959 |
| | 1888 | 20,535 | 19 | 1,081 |
| | 1889 | 22,426 | 20 | 1,121 |
| Total for Detroit..... | | 53,515 | 50 | 1,070 |
| Huron..... | 1887 | 13,600 | 22 | 622 |
| | 1888 | 22,275 | 31 | 719 |
| | 1889 | 25,459 | 39 | 653 |
| Total for Huron..... | | 61,424 | 92 | 668 |

A column of average tonnage has been inserted in the preceding table, and from the figures there given a very instructive lesson is to be learned. They show, for instance, that the vessels built at Cuyahoga had the highest average tonnage of any vessels built, irrespective of class. That average ran 1,363, 1,295, and 1,357 tons for 1887, 1888, and 1889, respectively, or an average vessel tonnage of 1,333 tons per vessel for the 3 years. This high average vessel tonnage is indeed a characteristic of shipbuilding on the lakes, but is especially characteristic of the new steamer fleets, as will be seen when Table 32 is reviewed.

The account of barge building, as shown in the recapitulation of Table 31, can hardly be regarded as of very much importance, because, as has been elsewhere said, the barges taken account of by the Commissioner of Navigation are only those that are registered, registration being optional with the owner. Still the table, so far as its value for comparative statistics goes, would not be complete without this entry. It is valuable, too, as showing that both in number and tonnage the building of barges, that is, of registered barges, is yearly diminishing; for while in 1881 the account shows the building of 14 barges with an aggregate tonnage of 3,111 tons, in 1889 only 2 were built, with an aggregate tonnage of 247 tons, and in 1884 there was but 1 small barge built.

The fluctuations of the building of sailing vessels is quite clearly shown in the recapitulation of Table 31, and while there was a gradual rise in the statistics of their construction from 47 in 1880 to 66 in 1882, there was a still more strongly marked declension from 1882 to 1886, in which latter year but 15 sailing vessels were built. The last 3 years in the table did not bring the number back to the large figures of 1882, although these years were marked by an unusual activity in the lake yards, the numbers running 34, 42, and 32. It will be noticed, however, that the aggregate tonnage suffered no such decline.

One has to look to the records of steamer building as shown in this recapitulation table (and in a still more condensed form in the accompanying summary) for the explanation of the increased importance of this branch of the shipbuilding industry.

TABLE H.—SUMMARY SHOWING THE NUMBER AND GROSS TONNAGE OF STEAMERS BUILT ON THE GREAT LAKES AND RIVER ST. LAWRENCE FROM 1880 TO 1889, INCLUSIVE.

| YEARS. | Number. | Gross tonnage. |
|-----------|---------|----------------|
| 1880..... | 63 | 14,106.46 |
| 1881..... | 109 | 49,080.21 |
| 1882..... | 128 | 33,596.45 |
| 1883..... | 100 | 17,253.42 |
| 1884..... | 80 | 20,205.60 |
| 1885..... | 64 | 20,228.52 |
| 1886..... | 46 | 12,610.73 |
| 1887..... | 75 | 47,183.46 |
| 1888..... | 139 | 86,715.98 |
| 1889..... | 145 | 93,706.73 |

The peculiarity of the steamer-building record, it will be seen, is that, notwithstanding the lack of any uniform increase in number, the tonnage shows a steady rise. Thus, while in 1881 the steamers built numbered 109, their tonnage being 49,080 tons, in 1888 the number of steamers built was 139, but the aggregate tonnage had risen to 86,716 tons; and while in 1882 the number of steamers was 128 as against 145 for 1889, the tonnage of the steamers

built in the first year was 33,596 tons as against 93,707 tons for the latter year. Reduced to the common denomination of average tonnage, these figures of comparison mean that in 1882 the average tonnage of the steamers built was 262.47 tons and that in 1889 the average tonnage of the steamers built was 646.25 tons. When, too, the calculation is made one of percentage, it is found that while the percentage of number showed an increase for 1889 over 1882 of 13.28 per cent, the percentage of tonnage showed an increase for 1889 over 1882 of 178.92 per cent.

METHODS OF PROPULSION.

Further evidence of a continued alteration in the condition of affairs is found in Table 32, wherein a division is made of all the steamers built during the 10 years 1880-1889 into the 3 classes of propulsory power, propeller, side-wheel, and stern-wheel. It will hardly be necessary to make any analysis of the yearly tables wherein the individual entries of the different districts are set down, although the story told there is an interesting one in many particulars, while by turning to the recapitulation the relative favor and use of the different classes may be seen at a glance. During the 10 years but 15 stern wheelers, having a tonnage of 2,696 tons, were built, while in the same period 889 propellers were built, with an aggregate tonnage of 367,275 tons. The side wheelers maintained their position with some firmness, although the difference between the 18 vessels which were built in 1882 and the 6 which were built in 1889 can not fail to be marked.

The popularity of the propeller is unquestioned and unmistakable, and even when a comparison is made between the 2 years of 1881 and 1882 with 1888 and 1889, these being the 4 years of the greatest activity, the increase for the 2 latter years, especially in tonnage, is certainly remarkable. The output of the different localities, so far as the number of steamers built goes, is set down in the following summary:

TABLE J.—STATEMENT SHOWING THE NUMBER OF PROPELLERS, SIDE-WHEEL, AND STERN-WHEEL STEAMERS BUILT IN THE CUSTOMS DISTRICTS OF THE GREAT LAKES AND RIVER ST. LAWRENCE DURING THE YEARS 1880-1889, INCLUSIVE.

| CUSTOMS DISTRICTS. | Propellers. | Side wheel. | Stern wheel. |
|--------------------|-------------|-------------|--------------|
| Total | 889 | 45 | 15 |
| Oswegatchie..... | 14 | | |
| Cape Vincent..... | 19 | 2 | |
| Oswego..... | 18 | | |
| Genesee..... | 8 | 2 | |
| Buffalo creek..... | 160 | 3 | |
| Cuyahoga..... | 89 | 13 | 3 |
| Sandusky..... | 15 | 3 | 2 |
| Miami..... | 12 | 1 | 1 |
| Detroit..... | 103 | 7 | |
| Huron..... | 126 | 1 | |
| Michigan..... | 133 | 1 | 7 |
| Chicago..... | 45 | 1 | |
| Milwaukee..... | 100 | 9 | 2 |
| Superior..... | 13 | | |
| Niagara..... | 17 | | |
| Erie..... | 13 | 1 | |
| Duluth..... | 2 | 1 | |
| Dunkirk..... | 2 | | |

MAGAZINE STATEMENTS.

The relative favor and use of the different classes of steamers may be easily gathered from the preceding table. Concerning the changes which have marked the history of construction of the whole lake fleet, Lieutenant Charles C. Rogers, United States Navy, says, in an article recently published in Scribner's:

The history of marine architecture does not furnish another instance of so rapid and complete a revolution in the material and structure of floating equipment as has taken place on the Great Lakes since 1886. In that year the total valuation of the vessels by Lloyds was about \$30,600,000. In 1889 60 new steamers and 11 sailing vessels, aggregating 70,000 tons and valued at \$6,650,000, were added to the fleet. During the 4 winters of 1886-1890 the tonnage of the lakes was nearly doubled, 206 vessels, measuring 399,975 tons, were turned out of the shipyards, with a valuation of \$27,389,000. During the same time the number of steamers of more than 1,500 net register tons increased from 21 to 110. The two valuations of the fleet already presented differ by more than \$9,000,000, but either one emphasizes the fact of the very recent and extraordinary growth of this commerce and renders it difficult to predict the increase in the tonnage and the size of vessels upon the lakes during the few years that remain till the opening of the next century. * * * The sailing vessel has almost disappeared from the lakes; the square-rigged ship is no longer seen, and only a few of the great cargo-carrying schooners are left. The sailing fleet was succeeded by the propellers, * * * with its tow of one or more consorts, and it in turn is giving way to the modern steamer, maintained at a little more than one-half the cost, while having a carrying capacity quite as great, a speed double that of the propeller and consort, and making two or three round trips for one of the tow. * * * The shipbuilders of the lakes are progressive, and keep pace with all improvements in marine architecture. Steel vessels are built with

double bottoms, water-tight compartments, triple expansion engines, and modern electrical and steam appliances. The structural strength may be realized from the fact that a large proportion are built for the trade in iron ore. At a time trial at Escanaba, during the summer of 1887, a steamer was loaded with over 2,000 tons of ore and steamed away from the dock in 45 minutes after being placed under the chutes. The record shows that another vessel was loaded with 2,800 tons of coal in 1 hour and 50 minutes; 300 tons for fuel were put on board in another hour; so that in 2 hours and 50 minutes after opening the hatches the vessel was loaded and coaled. That ordinary seagoing ships will not stand the strain of this traffic is demonstrated by the fact that 4 steel steamers built on the Clyde for Canadian owners had to be repaired and strengthened throughout after one season's work to fit them for further service. These vessels steamed across the Atlantic, were cut into halves on the lower St. Lawrence, the sections being then towed through the canals and put together on the lakes. 2 more were built on the Clyde, with the benefits of this experience and of the builder's visits to our northwestern shipyards. * * * The record of large cargoes is equally creditable. The Maryland, belonging to the InterOcean Transportation Company of Milwaukee, has carried 3,737 net tons of ore from Escanaba to South Chicago on a draft of 16.5 feet; the E. C. Pope, owned by Eddy Brothers, of Bay city, transported 3,628 net tons from Escanaba to Buffalo on 16 feet draft, and 3,167 tons from Ashland to Lake Erie, drawing 14.5 feet. * * * In the Cleveland shipyards were built the magnificent iron and steel fleets of the Northern Steamship Company, the Mutual Transportation line, and the Minnesota Iron Company of Chicago, costing \$200,000 each; those of the Western transit line of the New York Central railroad, the equals in speed, style, and carrying capacity to any ocean vessel, and the 5 passenger steamers of the Detroit and Cleveland Steam Navigation Company, costing as high as \$350,000 each, and ranking among the finest passenger boats in the country. From the shipyards of Chicago steel steamers of 4,000 to 5,000 tons displacement have been launched. 5 large steamer lines ply regularly to ports on lakes Erie, Huron, Superior, and Michigan, with a combined fleet of over 60 steamers and a capacity ranging from 1,750 tons to more than 3,000 tons. The Union Steamboat Company owns the Oswego and Chemung, the largest steamers of the lakes, with 4,800 tons displacement and a total cost of \$560,000; and it was on these lakes that the whaleback was first put to running.

FIGURES FROM LLOYDS.

In addition to the comparative statistics which have been collated from the census returns for 1880 and 1890 and from the data collected by the Commissioner of Navigation, a third series has been compiled from Lloyds Inland Register for the years 1886, 1887, 1888, 1889, and 1890. A bulletin giving these figures in detail was prepared by Mr. Charles H. Keep, under the direction of Professor Henry C. Adams, and was issued in February, 1891; but in view of the fact that the statistics in question cover but 6 years out of the decade and that the comparative statistics secured from the other sources just referred to are so much more comprehensive, it will be scarcely necessary to do more than to present a résumé containing the salient facts of the tables given in the bulletin in question.

Before considering these tables the reader should be notified that barges are included under the head of sailing vessels, and that no comparison between the totals secured from Lloyds and those from other sources can be effected owing to the fact that the Register only takes cognizance of certain craft, while so far as the values go those quoted by Lloyds are plainly excessive:

TABLE K.—STATEMENT SHOWING THE COMPARATIVE STATISTICS OF THE NUMBER, TONNAGE, AND VALUE OF THE FLOATING EQUIPMENT OF THE GREAT LAKES AND RIVER ST. LAWRENCE, DRAWN FROM LLOYDS REGISTER FOR THE YEARS 1886, 1887, 1888, 1889, AND 1890.

| CLASSIFICATION OF VESSELS. | 1886 | | | 1887 | | | 1888 | | | 1889 | | | 1890 | | |
|--|-------------|--------------|--------------|-------------|--------------|--------------|-------------|--------------|--------------|-------------|--------------|--------------|-------------|--------------|--------------|
| | No. of ves- | Net-ton- | Valuation | No. of ves- | Net-ton- | Valuation | No. of ves- | Net-ton- | Valuation | No. of ves- | Net-ton- | Valuation | No. of ves- | Net-ton- | Valuation |
| | sels. | nage of ves- | of ves- | sels. | nage of ves- | of ves- | sels. | nage of ves- | of ves- | sels. | nage of ves- | of ves- | sels. | nage of ves- | of ves- |
| | sels. | sels. | sels. | sels. | sels. | sels. | sels. | sels. | sels. | sels. | sels. | sels. | sels. | sels. | sels. |
| Total | 1,997 | 634,652 | \$30,597,450 | 1,829 | 606,353 | \$35,634,950 | 1,884 | 657,723 | \$42,210,200 | 1,947 | 753,819 | \$49,057,550 | 2,055 | 826,300 | \$58,128,500 |
| A—Structure: | | | | | | | | | | | | | | | |
| Side-wheel steamers | 43 | 14,150 | 1,404,500 | 38 | 13,692 | 1,637,000 | 36 | 13,742 | 1,609,500 | 30 | 16,443 | 2,163,000 | 42 | 16,949 | 2,209,500 |
| Propellers under 1,000 tons | 335 | 177,402 | 9,475,100 | 354 | 125,057 | 10,149,100 | 379 | 129,744 | 11,353,300 | 409 | 149,793 | 12,652,800 | 431 | 154,232 | 13,905,000 |
| Propellers between 1,000 and 1,500 tons. | 72 | 80,728 | 5,935,000 | 92 | 112,968 | 8,841,000 | 105 | 129,410 | 10,246,000 | 116 | 144,513 | 11,379,000 | 122 | 151,611 | 11,804,000 |
| Propellers over 1,500 tons.. | 21 | 34,868 | 2,645,000 | 31 | 51,761 | 4,085,000 | 46 | 78,103 | 6,923,000 | 75 | 130,235 | 11,802,000 | 110 | 188,390 | 17,737,000 |
| Tugs | 466 | 11,737 | 2,497,600 | 424 | 10,847 | 2,378,400 | 423 | 11,371 | 2,439,100 | 426 | 12,323 | 2,703,750 | 448 | 12,520 | 2,778,250 |
| Schooners | 730 | 183,792 | 5,398,850 | 587 | 166,167 | 4,972,050 | 582 | 164,240 | 5,691,800 | 580 | 164,285 | 4,947,500 | 577 | 158,620 | 4,726,150 |
| Barges | 330 | 125,975 | 3,151,400 | 303 | 125,861 | 3,572,400 | 313 | 131,113 | 3,947,500 | 302 | 136,227 | 4,309,500 | 325 | 144,038 | 4,968,000 |
| B—Material: | | | | | | | | | | | | | | | |
| Steel | 6 | 6,459 | 694,000 | 11 | 14,134 | 1,654,000 | 23 | 31,928 | 3,925,000 | 41 | 49,784 | 7,824,500 | 68 | 99,457 | 11,964,500 |
| Iron | 35 | 23,714 | 2,675,000 | 37 | 23,464 | 2,815,000 | 39 | 24,940 | 2,765,000 | 34 | 24,450 | 2,608,500 | 39 | 24,673 | 2,638,000 |
| Composite | 2 | 63 | 39,000 | 4 | 2,391 | 319,000 | 7 | 5,178 | 579,000 | 9 | 9,996 | 1,079,000 | 13 | 13,554 | 1,465,000 |
| Wood | 1,954 | 605,416 | 27,189,450 | 1,777 | 566,364 | 30,846,950 | 1,815 | 595,677 | 34,941,200 | 1,863 | 669,589 | 38,945,550 | 1,935 | 688,676 | 42,061,000 |
| C—Sail or steam: | | | | | | | | | | | | | | | |
| Steam vessels | 937 | 324,885 | 22,047,200 | 939 | 314,325 | 27,090,500 | 989 | 362,370 | 32,570,900 | 1,065 | 453,307 | 40,700,550 | 1,153 | 523,702 | 48,434,350 |
| Sailing vessels | 1,060 | 309,767 | 8,550,250 | 890 | 292,028 | 8,544,450 | 895 | 295,353 | 9,639,300 | 882 | 300,512 | 9,257,000 | 902 | 302,658 | 9,694,150 |

CHANGES IN EQUIPMENT.

In the text of Bulletin No. 29, Professor Adams said:

It would be difficult to add anything to the impression which a study of the preceding figures must produce. There are, however, certain facts to which it may not be inappropriate to call particular attention.

First. The figures presented in the tables show that sailing vessels are fast giving place to vessels propelled by steam. Taking schooners and barges together, and comparing the figures for 1886 and 1890, it appears that there has been a decrease of 14.91 per cent in number, 2.29 per cent in tonnage, and 13.38 per cent in value. Taking schooners and barges separately, the greater decrease is in schooners. Thus, although there is an actual decrease in the number of barges in 1890 as compared with those of 1886, there is an increase of 14.34 per cent in the tonnage of this class of vessels. These facts indicate an increased use of steam both for immediate propulsion and for towing.

Second. The figures show that steam vessels which have been built during the last 4 years are of a constantly increasing size. In 1886 there were but 21 propellers of over 1,500 tons burden, in 1890 there were 110 propellers of this class. But the tonnage of vessels of this class has increased more rapidly than their number. Thus the total tonnage of the 21 vessels of over 1,500 tons burden in 1886 was 34,868 tons, while the total tonnage of the 110 vessels in 1890 was 188,390 tons; that is to say, the percentage of increase in the number of vessels is 423.81, while the percentage of increase in tonnage is 440.29. The total value of this class of vessels in 1886 was \$2,645,000, in 1890 it was \$15,000,092, showing an increase for the 4 years of 570.59 per cent. A comparison similar to this for any of the classes of vessels, when taken in connection with well-known facts relative to the ownership of these large vessels, clearly shows that the traffic of the Great Lakes is rapidly coming under the control of companies having at their command large capital.

Third. The same conclusion may be arrived at if the changes in the material made use of in the building of new vessels are considered. Steel is more generally used for large vessels than iron, composite, or wood. In 1886 there were but 6 steel vessels afloat on the lakes, with an aggregate tonnage of 6,459 tons and an aggregate value of \$694,000. If by the side of these figures are placed the corresponding data for the year 1890, it appears that there are now 68 steel vessels afloat on the lakes, with an aggregate tonnage of 99,457 tons and an aggregate value of \$11,964,000. This shows an increase in number of vessels of 1,033.33 per cent, in tonnage of 1,439.82 per cent, and in valuation of 1,623.99 per cent. Iron and wooden vessels have barely held their own during these years. Vessels built of composite, on the other hand, show a marked increase, both in number, tonnage, and value. These facts indicate that a new factor is being introduced into the problem of transcontinental transportation.

THE THREE CANALS.

The comparative statistics furnished in the 3 series of tables which have just been reviewed are important and valuable as showing how steady and rapid the growth of trade has been on all the lakes, treated as a system, but it may be stated without any attempt at discrimination that the development of Lake Superior's commerce has been exceptionally remarkable. This has been undoubtedly due, in a very large part, to the opening of the St. Marys Falls canal, and it will be quite in keeping with the plan of the text to consider at this point the results which have attended the inception and extensions of this passageway between the "Brother to the Sea" and the lower lakes, and then to somewhat more briefly consider the returns of the other 2 statistical keys to the commerce of the Great Lakes, the Detroit river and canal and the Welland canal.

THE ST. MARYS FALLS CANAL.

Long after a population had moved into the states and territories bordering on the other lakes of the system Lake Superior was unknown and unexplored. "For two centuries", says General Poe, "this greatest of all inland seas lay in distant isolation enfolded by a wilderness, the coming civilization heralded only by the missionary and fur trader coasting along its silent shores". The mineral treasures in this "enfolding wilderness", originally drew the explorer up the St. Marys river, but it was not until 1855, when the canal and first lock at St. Marys were completed, that the commerce of Lake Superior can be said to have had any appreciable existence. It will not be necessary to follow the growth of the commerce through the canal year by year, but taking the traffic report from 1881, at which date the new and larger lock was constructed, it is seen that in 1882 there passed the canal 2,029,000 tons of freight, in 1883 there were 2,267,000 tons; in 1885 these figures had risen to 2,356,000 tons, in 1886 to 4,527,750 tons, in 1887 to 5,494,649 tons; that in 1888 the figures passed the six-million limit, standing at 6,411,423 tons; that in 1889 they were 7,516,022 tons, and that in 1890 they had risen to 9,041,213 tons, a record of increase in traffic which is certainly unparalleled.

Taking up the subject in a somewhat more detailed form, a treatment which the importance and pertinency of the subject merits, it is found that the canal for 1889 was open to navigation 234 days, the first vessel having passed April 15, and the last December 4, 1889, thus making the season 22 days longer than that of 1888. The average number of vessels passing per day for the whole season was 40.9, and for the months of June, July, and August, 50. The number of vessel passages of all classes exceeded that of the preceding season by 1,776, or a little less than 23 per cent. The increase in the freight movement for 1889 over that of 1888 was 1,104,599 tons, or 17 per cent, while the increase in registered tonnage was 2,091,276 tons, or 41 per cent. This wide discrepancy was due to the low stage of water, which did not permit vessels to carry full loads. Tables L, M, and N, on the following page, show these facts, as well as furnish a comparative statement of the amount and value of commerce passing through the canal for the calendar years 1888 and 1889.

TABLE L.—STATEMENT SHOWING THE INCREASE IN THE DETAILS OF BUSINESS DONE AT THE ST. MARYS FALLS CANAL IN 1888 AND 1889.

| ITEMS. | Unit of fact. | NUMBER AND AMOUNT. | | INCREASE. | |
|---------------------------|----------------|--------------------|-----------|--------------------|-----------|
| | | 1888 | 1889 | Number and amount. | Per cent. |
| Vessels | Number | 7,803 | 9,579 | 1,776 | 23 |
| Lockage | Number | 3,845 | 4,684 | 839 | 22 |
| Tonnage, registered | Net tons | 5,130,659 | 7,221,935 | 2,091,276 | 41 |
| Tonnage, freight | Net tons | 6,411,423 | 7,516,022 | 1,104,599 | 17 |
| Passengers | Number | 25,558 | 25,712 | 154 | 1 |

TABLE M.—STATEMENT SHOWING THE INCREASE AND DECREASE IN THE AMOUNT OF THE VARIOUS COMMODITIES PASSING THE ST. MARYS FALLS CANAL DURING 1888 AND 1889.

| ITEMS. | Unit of measurement. | QUANTITY. | | INCREASE. | | DECREASE. | |
|------------------------------|----------------------|------------|------------|-----------|-----------|-----------|-----------|
| | | 1888 | 1889 | Amount. | Per cent. | Amount. | Per cent. |
| Coal (hard and soft) | Net tons | 2,105,041 | 1,629,197 | ..... | ..... | 475,844 | 23 |
| Flour | Barrels | 2,190,725 | 2,228,707 | 37,982 | 2 | ..... | ..... |
| Wheat | Bushels | 18,596,351 | 16,231,854 | ..... | ..... | 2,364,497 | 13 |
| Other grain | Bushels | 2,022,308 | 2,133,245 | 110,937 | 5 | ..... | ..... |
| Manufactured iron | Net tons | 48,859 | 31,545 | ..... | ..... | 17,314 | 35 |
| Pig iron | Net tons | 14,844 | 26,016 | 11,172 | 75 | ..... | ..... |
| Salt | Barrels | 210,433 | 168,250 | ..... | ..... | 42,183 | 20 |
| Copper | Net tons | 28,960 | 33,456 | 4,496 | 16 | ..... | ..... |
| Iron ore | Net tons | 2,570,517 | 4,095,855 | 1,525,338 | 59 | ..... | ..... |
| Lumber | M. ft. B. M. | 240,372 | 315,554 | 75,182 | 31 | ..... | ..... |
| Silver ore and bullion | Net tons | 3,385 | 5,047 | 2,562 | 76 | ..... | ..... |
| Building stone | Net tons | 33,541 | 33,538 | ..... | ..... | 3 | ..... |
| Unclassified freight | Net tons | 345,854 | 312,410 | ..... | ..... | 33,444 | 10 |

TABLE N.—STATEMENT SHOWING THE INCREASE AND DECREASE IN THE VALUE OF THE VARIOUS COMMODITIES PASSING THE ST. MARYS FALLS CANAL DURING 1888 AND 1889.

| ITEMS. | Unit of measurement. | Price per unit. | TOTAL VALUATION. | | Increase in value. | Decrease in value. |
|----------------------------|----------------------|-----------------|------------------|-------------|--------------------|--------------------|
| | | | 1888 | 1889 | | |
| Coal | Net tons | \$3.50 | \$7,307,644 | \$5,702,190 | ..... | \$1,665,454 |
| Flour | Barrels | 5.00 | 10,953,625 | 11,143,535 | \$189,910 | ..... |
| Wheat | Bushels | 0.98 | 18,224,424 | 15,907,217 | ..... | 2,317,207 |
| Other grain | Bushels | 0.98 | 1,981,862 | 2,090,580 | 108,718 | ..... |
| Manufactured iron | Net tons | 50.00 | 2,442,950 | 1,577,250 | ..... | 865,700 |
| Pig iron | Net tons | 17.00 | 252,348 | 442,272 | 189,924 | ..... |
| Salt | Barrels | 1.00 | 210,433 | 168,250 | ..... | 42,183 |
| Copper | Net tons | 200.00 | 5,792,000 | 6,691,200 | 899,200 | ..... |
| Iron ore | Net tons | 3.50 | 8,996,810 | 14,335,403 | 5,338,683 | ..... |
| Lumber | M. ft. B. M. | 18.00 | 4,326,696 | 5,679,972 | 1,353,276 | ..... |
| Silver ore | Net tons | 153.79 | 520,579 | 914,589 | 394,010 | ..... |
| Building stone | Net tons | 10.00 | 335,410 | 335,380 | ..... | 30 |
| Unclassified freight | Net tons | 60.00 | 20,751,240 | 18,744,600 | ..... | 2,006,640 |
| Total ..... | ..... | ..... | 82,150,021 | 89,732,528 | 8,473,721 | 6,897,214 |
| Net increase ..... | ..... | ..... | ..... | ..... | 1,576,507 | ..... |

QUANTITIES AND VALUES.—It will be observed that the increase in the amount of iron ore transported in 1889 over that transported in 1888 was no less than 1,525,338 tons, figures which are actually greater than the total increase of freight moved during the season, that increase being 1,104,599 tons. The figures 1,525,338 tons are, however, diminished or offset by a decrease in both the coal and wheat traffic. The decrease in the coal traffic amounted to 475,844 tons, or 23 per cent, and was probably owing to a lighter demand for the mineral, due to the preceding mild winter. It should be stated that in the valuations which are put on the freight the same prices per unit are employed for both the years 1888 and 1889, as it is believed that this method affords a better basis for comparing the business year by year than if the prices were amended to conform to each annual quotation.

The total number of vessels, 9,579, which is set down as the record of those passing through the canal in 1889, includes 6,501 steamers, 2,635 sailing vessels, and 443 unregistered craft in tow.

The unclassified freight, it will be observed, has been brought down to 4 per cent of the total freight movement, and even this small percentage may be reduced by the statement that it includes 2,946 tons of wool and 304 tons of hides.

No returns had been received up to the time of writing of a sufficiently recent date to be available for the construction of a detailed comparative table for 1889 and 1890, but the following statement of the business of the canal for the fiscal year ending June 30, 1890, will show that the steady increase of business marking the preceding years would surely attend the report for the completed season of 1890, while the statement immediately following it (Table P) will show by totals the uninterrupted growth of the canal's commercial importance for the 4 calendar years 1887-1890, inclusive:

TABLE O.—STATEMENT OF THE BUSINESS OF THE ST. MARYS FALLS CANAL DURING THE FISCAL YEAR ENDED JUNE 30, 1890.

| NUMBER AND CLASS OF VESSELS PASSED. | |
|-------------------------------------|--------|
| Side-wheel steamers..... | 76 |
| Propellers..... | 6,806 |
| Sailing vessels..... | 2,834 |
| Rafts and unregistered craft..... | 392 |
| Total passages..... | 10,108 |

| FREIGHT AND PASSENGER TRAFFIC. | |
|--|-------------|
| Coal (net tons)..... | 1,894,483 |
| Copper (net tons)..... | 36,086 |
| Flour (barrels)..... | 2,592,736 |
| Wheat (bushels)..... | 19,459,736 |
| Other grain (bushels)..... | 2,732,698 |
| Iron ore (net tons)..... | 4,404,935 |
| Pig and manufactured iron (net tons)..... | 72,163 |
| Salt (barrels)..... | 5,905 |
| Lumber (feet, board measure)..... | 308,032,000 |
| Building stone (net tons)..... | 40,829 |
| Wool (net tons)..... | 2,597 |
| Hides (net tons)..... | 455 |
| Miscellaneous and unclassified freight (net tons)..... | 344,425 |
| Number of passengers..... | 24,125 |
| Total registered tonnage (net tons)..... | 7,899,604 |
| Total freight tonnage (net tons)..... | 8,288,580 |
| Total registered tonnage since opening the canal in 1855 (net tons)..... | 56,539,876 |

TABLE P.—STATEMENT SHOWING THE COMPARATIVE TOTALS OF THE ST. MARYS FALLS CANAL FOR THE YEARS 1887, 1888, 1889, AND 1890.

| YEARS. | TONNAGE PASSED THROUGH. | | Valuation of cargoes. | Cost of water carriage. | Cost per ton-mile. | Value of the fleet. |
|-----------|----------------------------|--------------------------|-----------------------|-------------------------|--------------------|---------------------|
| | Registered vessel tonnage. | Net tons actual freight. | | | | |
| 1887..... | 4,897,598 | 5,494,649 | \$79,031,757 | \$10,075,153 | 2.3 mills. | \$19,773,950 |
| 1888..... | 5,130,659 | 6,411,423 | 82,156,021 | 7,883,077 | 1.5 mills. | 21,895,400 |
| 1889..... | 7,221,935 | 7,516,022 | 83,732,528 | 8,634,246 | 1.5 mills. | 26,926,200 |
| 1890..... | 8,454,435 | 9,041,213 | 102,214,948 | 9,472,214 | 1.3 mills. | 29,635,500 |

By comparing the freight tonnage given in Table O as passing through the St. Marys Falls canal with the total receipts and shipments by Lake Superior ports it will be noticed that the canal tonnage exceeds the figures given in Table 7, the canal tonnage being 8,288,580 tons, while the Lake Superior tonnage stands at only 7,925,930, a difference of 362,650 tons. This is due in part to the fact that the year covered by the canal report is made up of the last 6 months of the year 1889 and the first 6 months of the year 1890, while the year from which the lake report is made is composed of the 12 months ending December 31, 1889, and it will be remembered that the winter embraced within the fiscal year 1889-1890 was a remarkably open one, thus permitting a late fall and an early spring trade. The discrepancy referred to is also partly explained by the fact that the tables of receipts and shipments for Lake Superior do not include the traffic between Canadian ports, and consequently take no account of the lake commerce of the Canadian Pacific railway originating at Port Arthur and passing through the canal. Some idea of the extent of this commerce may be gained from the fact that of the wheat passing through the canal during the lake navigation season of 1889 not less than 2,603,539 bushels are known to have been shipped from Port Arthur, while it is believed that the total shipments from that port may have been as high as 3,000,000 bushels, or 90,000 tons.

The statement for the fiscal year of 1889-1890 is particularly interesting because it rounds up the period of 35 years, which date back to the opening of the canal in 1855. The statistics of freight movement have not been kept with sufficient exactness for that number of years to give reliable details, but the records show that for the 35 years of its existence ending June 30, 1890, there had passed through the canal no less than 56,539,876 tons of freight. It is no less interesting to find that of this aggregate 35,588,389 tons, or about five-eighths of the whole, had passed since the opening of the new lock, September 1, 1881. The statement for the fiscal year 1889-1890 also includes the interesting but unspecified fact that during the last month of the fiscal year (June, 1890) the amount of freight which passed through the canal was 1,413,001 tons, the largest monthly amount on record, and that on one day in the same year, May 26, 1890, there passed through 74,686 tons of freight, this being the largest daily amount ever recorded. From 7:10 a. m., May 25, to 5:58 a. m., May 27, 1890, a period of 46 hours and 48 minutes, the lock was constantly in motion. These figures show that the limit of the present canal's capacity is being rapidly approached. In fact, it was seen as long ago as 1886 that the ultimate capacity of the canal would be reached in a very few years, and a still further enlargement was then proposed, which is now in progress. This will consist of a lock 800 feet long by 100 feet wide, with a depth of 21 feet on the sills, a lift of 18 feet (the full descent of St. Marys Falls), and the deepening of the canal to 20 feet. The new lock is to be placed upon the site of the two old ones, which lie between the present lock and the river, and will be used in connection with that now in operation. The cost of the enlargement is estimated at \$4,738,865; the time for its execution was set for 5 years, and when finished it will be the largest single lock in the world. If on the completion of this enlargement the traffic of the canal takes such an upward bound as it did after the second enlargement, and there is no reason to doubt that it will, it seems certain that its traffic returns will still more distinctly lead those of the Suez canal than they do now.

OPERATIONS AND EARNINGS.—Among the various facts and figures which have been gathered at the canal as the "statistical key" to so large a portion of the lake traffic, none are more interesting than those of the earnings and operations of the craft passing the canal. In order to determine the total amount paid for the lake transportation of the freight carried through the canal during the season of 1889, a calculation of the freight rates between Lake Superior and the lower lake ports was made from the results of a diligent collection of data by the United States Army engineers in charge, and this adopted mean rate was applied to the amounts of freight passing the canal with the result seen in the following table, which shows the total cost of carrying the freight; or, to put it in another way, it shows the gross earnings of the various vessels made by the transportation of the indicated freight:

TABLE Q.—STATEMENT SHOWING THE FREIGHT RATE PER UNIT OF THE SEVERAL COMMODITIES CARRIED THROUGH THE ST. MARYS FALLS CANAL DURING THE SEASON OF 1889, TOGETHER WITH THE TOTAL AMOUNTS PAID FOR THE MOVEMENTS OF THE TOTAL COMMODITIES.

| ARTICLES. | Unit. | Quantity. | Freight rate per unit. | Amount paid for freighting. |
|------------------------------|----------------|--------------|------------------------|-----------------------------|
| Total | | | | \$8, 634, 246. 63 |
| Coal | Ton | 1, 629, 197 | \$0. 47 | 765, 722. 59 |
| Flour | Barrel | 2, 228, 707 | 0. 18. | 401, 167. 26 |
| Wheat | Bushel | 16, 231, 854 | 0. 04 | 649, 274. 16 |
| Other grain | Bushel | 2, 133, 245 | 0. 03½ | 69, 330. 46 |
| Manufactured iron | Ton | 31, 545 | 2. 10 | 66, 244. 50 |
| Pig iron | Ton | 26, 016 | 1. 45 | 37, 723. 20 |
| Salt | Barrel | 168, 250 | 0. 18 | 30, 285. 00 |
| Copper | Ton | 33, 456 | 2. 25 | 75, 276. 00 |
| Iron ore | Ton | 4, 095, 855 | 1. 14 | 4, 669, 274. 70 |
| Lumber | M feet, B. M.. | 315, 554 | 2. 70 | 851, 995. 80 |
| Silver ore and bullion | Ton | 5, 947 | 1. 90 | 11, 299. 30 |
| Building stone | Ton | 33, 538 | 2. 07 | 69, 423. 66 |
| General merchandise | Ton | 312, 410 | 3. 00 | 937, 230. 00 |

The nature of the data from which the preceding table was formed was such that it included cost of loading and unloading.

Put into a condensed form the results obtained were as follows:

| | |
|--|-------------------|
| Total mile-tons | 5, 940, 646, 352 |
| Total freight paid | \$8, 634, 246. 63 |
| Cost per ton-mile | mills.. 1. 5 |
| Average distance freight was carried | miles.. 790. 4 |

STATISTICS OF TRANSPORTATION.

CANADIAN AND AMERICAN TONNAGE.—It has been said that the returns of tonnage made for the canal embrace both American and Canadian craft, and in the following statement a segregation of these is made, it being understood that the number of vessels given represents the actual number of craft which passed the canal during the year 1889, counted only as a fleet, and not as a repetitive aggregate:

TABLE R.—STATEMENT SHOWING THE NUMBER, TONNAGE, AND VALUE, AND PASSENGER AND FREIGHT TRAFFIC OF AMERICAN AND CANADIAN CRAFT PASSING THROUGH THE ST. MARYS FALLS CANAL IN THE SEASON OF 1889.

| CRAFT. | Number. | Vessel tonnage. | Freight tonnage. | Number of passengers. | Valuation of vessels. |
|----------------------------------|---------|-----------------|------------------|-----------------------|-----------------------|
| Total | 581 | 394,727 | 7,516,022 | 25,712 | \$26,989,389 |
| American vessels | 521 | 371,264 | 7,254,309 | 13,740 | 25,391,789 |
| Steamers (registered)..... | 308 | 250,959 | 4,964,724 | 13,740 | 20,947,500 |
| Sail vessels (registered)..... | 208 | 118,595 | 2,253,900 | ..... | 4,381,100 |
| Sail vessels (unregistered)..... | 5 | 11,710 | 35,685 | ..... | 63,189 |
| Canadian vessels | 60 | 23,463 | 261,713 | 11,972 | 1,597,600 |
| Steamers (registered)..... | 37 | 15,422 | 211,075 | 11,972 | 1,385,000 |
| Sail vessels (registered) | 23 | 8,041 | 50,638 | ..... | 212,600 |

a Estimated.

The following facts regarding this canal may be stated in conclusion:

The comparatively small average distance which freight was carried in 1889 is because in that year there was a falling off in the transportation of wheat, already referred to, and an increase in that of ore, which is a shorter distance freight.

The greatest number of miles run by any one steamer during 1889 was 33,344, by the propeller Athabaska.

The greatest amount of freight carried and the greatest number of mile-tons to the credit of any one vessel during the season was by the freight propeller Northern Wave, which amounted to 59,001 net tons of freight and 58,311,447 mile-tons.

The largest single cargo carried by a steamer was 2,839 net tons, by the freight propeller Pontiac.

The largest single cargo carried by any vessel was by the lumber barge Walnapatae, and consisted of 2,030,000 feet, board measure, green lumber, estimated at 4,060 tons.

DETROIT RIVER AND CANAL.

Just as the St. Marys Falls canal stands as the statistical key to the commerce entering and leaving Lake Superior, so the Detroit river stands between that of Lake Erie and the upper lakes. In the case of the St. Marys Falls canal a very large portion of the traffic was that which owes its origin to Lake Superior and the northwest territory, while in the case of Detroit river all the lakes can be said to be brought under contribution. A description of the improvements which have been made by the United States Army Corps of Engineers in and about Detroit river will be found in that portion of the text which may be considered as an annotation on the table of congressional appropriations. As to the commerce of American craft which passes through Detroit river, the round figures for the navigation season of 1889 are 90,000 tons of registered tonnage per day, or nearly 20,000,000 tons per year. The exact figures for the 234 days of navigation, which made up that season, are set down in the following summary, it being understood that the figures of number and tonnage are the aggregates of every day's record:

TABLE S.—STATEMENT SHOWING THE NUMBER AND TONNAGE OF THE VESSELS PASSING THROUGH DETROIT RIVER DURING THE SEASON OF 1889, WITH A SEGREGATION BY NATIONALITIES.

| NATIONALITIES. | Number. | Tonnage. |
|----------------|---------|------------|
| Total | 59,737 | 36,203,606 |
| American..... | 32,415 | 19,646,000 |
| Canadian | 27,322 | 16,557,606 |

The figures of comparison between the Canadian traffic of the seasons of 1888 and 1889 are not at hand, but from the returns made of the commerce in American bottoms it is found that the increase in the number of vessels passing Detroit river in 1889 over 1888 was 1,011, while the increase in the tonnage was 546,940 tons.

The freight movement through the river for the year in American craft is given by principal commodities in the following table, and it is an interesting point to note how close is the total of freight traffic to that of the

total of vessel tonnage, namely, 19,717,860 tons of freight to 19,646,000 tons of tonnage, which is the aggregate of the registered tonnage of the 32,415 American vessels which passed and repassed through the river in the process of carrying the freight in question:

TABLE T.—STATEMENT SHOWING THE ESTIMATED WEIGHT IN TONS OF THE FREIGHT PASSING THROUGH DETROIT RIVER IN AMERICAN VESSELS FOR THE SEASON OF 1889.

| | |
|--------------------|--------------|
| Barley..... | 38, 294 |
| Coal..... | 5, 313, 419 |
| Corn..... | 1, 777, 750 |
| Flour..... | 655, 395 |
| Iron ore..... | 6, 610, 293 |
| Lumber..... | 2, 545, 792 |
| Laths..... | 23, 699 |
| Oats..... | 262, 896 |
| Pig iron..... | 94, 337 |
| Salt..... | 47, 737 |
| Shingles..... | 27, 668 |
| Wheat..... | 824, 451 |
| Other grain..... | 105, 412 |
| Miscellaneous..... | 1, 390, 717 |
| Total..... | 19, 717, 860 |

THE WELLAND CANAL.

The third great canal to be mentioned when considering the facilities of intercommunication between the lakes, and which occupies a position in their statistical economy almost equal in importance to that of the St. Marys Falls canal and Detroit river, is the Welland canal, connecting Lake Erie and Lake Ontario. The present Welland canal is so different in many of its features to the old Welland canal that it is known as and practically is a new canal: It starts from Port Colborne, on Lake Erie, at the head of Gravely bay, and reaches a summit level near Allanburg, from which point to Port Dalhousie, on Lake Ontario, a distance of 12 miles, there are 25 lift locks and regulating weirs, piers, and abutments for 12 road and 2 railroad bridges, 6 culverts to carry water courses under the canal and 1 for a public road, and a tunnel for the Great Western railroad. The engineering difficulties were largely encountered in this northern division, although in the southern division, which embraces the 15 miles between Port Colborne and Allanburg, the canal is crossed by 6 road and 3 railroad bridges, including an aqueduct of large dimensions through the Chippewa river, a lock at Welland, and another with 4 sets of gates at Port Colborne. The money expended on the undertaking up to 1889 amounted to \$23,787,950, since which time the amount has been raised to nearly \$25,000,000. Close statistics can not be given of the traffic conducted through the Welland canal, the work being under the control of the Canadian government, but it is stated by Mr. W. A. Livingstone, of Detroit, in his pamphlet entitled "The Great Lakes Problem", that the total traffic of actual freight in 1890 through the Welland canal was 1,016,165 net tons; that the quantity passing eastward through the canal from United States ports to United States ports had increased from 96,226 tons in 1881 to 318,259 tons in 1890, and that the increase in this movement in 1890 over that of 1880 was 20,906 tons.

The whaleback steamers of the American Steel Barge Company are the largest vessels that have passed through the Welland canal, and they are 265 feet long, 38 feet beam, and have an average draft of 15 feet when loaded.

CONGRESSIONAL APPROPRIATIONS.

The earliest appropriation made by the government for the improvement of the harbors of the Great Lakes and river St. Lawrence was in 1823, when an appropriation was made for the survey of Erie harbor of Pennsylvania. Since that time nearly 150 localities, scattered over the Great Lakes and St. Lawrence and Niagara rivers, have been improved under congressional aid. The sums appropriated up to the close of 1890 amounted to \$40,912,975, of which amount \$23,700,565 was appropriated up to and including 1879, \$12,999,165 was included in the decade marked by 1880-1889, inclusive, the remaining \$4,213,245 having been appropriated by the act of Congress of September, 1890.

For the improvement of the various harbors and shipping points on Lake Superior there has been appropriated \$9,233,300, the earliest appropriation going back to 1858, between which time and the close of 1879 there was appropriated \$3,467,555, the sum of \$3,738,500 having been appropriated from 1880 to 1889, and \$2,027,245 by the act of Congress of September, 1890.

For Lakes Huron and St. Clair the appropriations have been \$3,691,700, of which amount \$1,934,310 was appropriated from 1852 to the close of 1879, \$1,511,890 for the decade ending with 1889, and \$245,500 by the act of Congress of September, 1890.

The appropriations for the improvement of Lake Michigan ports have been \$11,251,243, the earliest appropriation being in 1826, for La Plaisance bay, when that harbor was improved by the expenditure of \$19,803. The act of Congress of September, 1890, allotted \$893,000 for the improvement of all the lake points; but the largest appropriations were made up to and including 1879, by which time \$6,440,843 of the public moneys had been granted for the lake improvements, while for the period 1880-1889 the appropriations amounted to \$3,917,400.

The appropriations for Lake Erie began the earliest of all the lakes, the first, as was noted in the previous paragraph, being made in 1823. The total amount appropriated for this lake up to the close of 1890 was \$8,879,336, of which amount by far the largest portion, \$5,362,336, was appropriated by the close of 1879, the appropriations for the years 1880-1889 being \$2,712,500, and the sum granted by the act of Congress of September, 1890, being \$804,500.

Lake Ontario's appropriations have amounted to \$3,592,730, of which amount \$2,581,855 was appropriated up to the close of 1879, \$895,875 during the 10 years ending 1889, and \$115,000 by the 1890 act of Congress.

On the improvements of St. Lawrence river there has been expended \$251,506 and on those of Niagara river the appropriations have amounted to \$233,598.

Between the sum of these amounts, however, and the \$40,912,975 given as the total appropriation for the Great Lakes there is a difference of \$3,779,562, that sum being made up by general appropriations for which there was no indication of special locality, but which were made for such comprehensive purposes as general survey, chart making, and the building of survey steamers and dredging machines.

In the assignment of appropriations made in the preceding paragraphs the lakes have been made the recognized divisions, but when charged to the states which lie around the lakes the amounts stand as set down in the following statement:

TABLE U.—STATEMENT SHOWING THE AMOUNTS APPROPRIATED BY CONGRESS FOR THE SURVEY, IMPROVEMENT, AND MAINTENANCE OF THE HARBORS OF THE GREAT LAKES AND ST. LAWRENCE RIVER, GIVEN BY PERIODS AND ALLOTTED TO THE RESPECTIVE STATES IN WHICH THE HARBORS LIE.

| STATES. | Date of earliest appropriation. | Appropriations up to and including 1879. | Appropriations from 1880 to 1889, inclusive. | Appropriations by act of Congress September, 1890. | Total appropriations up to date. |
|--|---------------------------------|--|--|--|----------------------------------|
| Total | | \$23,700,565 | \$12,999,165 | \$4,213,245 | \$40,912,975 |
| Minnesota | 1871 | 271,050 | 413,750 | 147,350 | 832,150 |
| Wisconsin | 1836 | 2,408,881 | 1,483,000 | 472,395 | 4,364,276 |
| Michigan | 1826 | 7,266,398 | 5,790,300 | 2,298,500 | 15,355,298 |
| Illinois | 1833 | 1,426,005 | 1,120,400 | 205,000 | 2,751,405 |
| Indiana | 1836 | 679,889 | 381,250 | 57,500 | 1,118,639 |
| Ohio | 1825 | 2,580,987 | 1,658,500 | 429,500 | 4,668,987 |
| Pennsylvania | 1823 | 616,367 | 235,500 | 40,000 | 891,867 |
| New York | 1826 | 4,729,426 | 1,858,375 | 563,000 | 7,150,801 |
| General appropriations, all states | 1836 | 3,721,562 | 58,000 | ..... | 3,779,562 |

For convenience of reference the following list of harbors and trading points which have been improved by government aid has been prepared, the localities being grouped under the titles of the lakes on which they are found, with the state of each locality added:

IMPROVED HARBORS AND RIVERS.

LAKE SUPERIOR.

Agate bay, Minnesota.
Ashland harbor, Wisconsin.
Duluth harbor, Minnesota.
Eagle harbor, Michigan.
Grand Marais harbor, Minnesota.
Grand Marais harbor of refuge, Michigan.
Marquette harbor, Michigan.
Ontonagon harbor, Michigan.
Portage-Lake ship canal, Michigan.
St. Marys river and St. Marys Falls canal, Michigan.
Superior and St. Louis bays, Wisconsin.

LAKES HURON AND ST. CLAIR.

Alpena harbor (Thunder bay), Michigan.
An Sable river and harbor, Michigan.
Belle river, Michigan.
Black river, Michigan.

LAKES HURON AND ST. CLAIR—continued.

Cheboygan harbor, Michigan.
Clinton river, Michigan.
Clinton harbor, Michigan.
Detroit river, Michigan.
Harbor of refuge at Sand beach, Michigan.
St. Clair river flats and canal, Michigan.
Saginaw river, Michigan.
Sebawaing harbor, Michigan.

LAKE MICHIGAN.

Ahnapee harbor, Wisconsin.
Black Lake harbor, Michigan.
Calumet harbor and river, Illinois.
Cedar river (Green bay), Michigan.
Charlevoix harbor, Michigan.
Chicago harbor, Illinois.
Fox river, mouth of, Wisconsin.
Frankfort harbor, Michigan.

LAKE MICHIGAN—continued.

Grand Haven harbor, Michigan.
Grand river, Michigan.
Green Bay harbor, Wisconsin.
Kenosha harbor, Wisconsin.
Kewanee harbor, Wisconsin.
Lake Winnebago, Wisconsin.
La Plaisance bay, Michigan.
Ludington harbor, Michigan.
Manistee harbor, Michigan.
Manistique harbor, Michigan.
Manitowoc harbor, Wisconsin.
Menominee harbor, Wisconsin.
Michigan city (outer harbor), Indiana.
Michigan city (inner harbor), Indiana.
Milwaukee bay, Wisconsin.
Milwaukee harbor, Wisconsin.
Muskegon harbor, Michigan.
New Buffalo harbor, Michigan.

IMPROVED HARBORS AND RIVERS—Continued.

LAKE MICHIGAN—continued.

Oconto harbor, Wisconsin.
 Pensaukee harbor, Wisconsin.
 Pentwater harbor, Michigan.
 Petoskey harbor, Michigan.
 Port Washington, Wisconsin.
 Portage Lake harbor of refuge, Michigan.
 Racine harbor, Wisconsin.
 St. Josephs harbor, Michigan.
 St. Josephs river (survey), Michigan.
 Saugatuck harbor, Michigan.
 Sheboygan harbor, Wisconsin.
 South Haven harbor, Michigan.
 Sturgeon bay, Wisconsin.
 Two Rivers harbor, Wisconsin.
 Waukegan harbor, Illinois.
 White river harbor, Michigan.

LAKE ERIE.

Ashtabula harbor, Ohio.
 Black river harbor, Ohio.
 Buffalo harbor, New York.

LAKE ERIE—continued.

Cattaraugus creek, New York.
 Cleveland harbor, Ohio.
 Conneaut harbor, Ohio.
 Cunningham creek, Ohio.
 Dunkirk harbor, New York.
 Erie harbor, Pennsylvania.
 Grand river harbor (Fairport), Ohio.
 Huron river and harbor, Ohio.
 Monroe harbor, Michigan.
 Port Clinton harbor, Ohio.
 Portland harbor, New York.
 Rocky river harbor, Ohio.
 Rouge river, Michigan.
 Sandusky city harbor, Ohio.
 Sandusky river, Ohio.
 Toledo harbor, Ohio.
 Vermilion river, Ohio.

LAKE ONTARIO.

Black river (Sacketts harbor), New York.
 Charlotte harbor, New York.

LAKE ONTARIO—continued.

Great Sodus bay, New York.
 Little Sodus bay, New York.
 Oak Orchard harbor, New York.
 Olcott harbor, New York.
 Oswego harbor, New York.
 Port Ontario harbor, New York.
 Pultneyville harbor, New York.
 Sacketts harbor, New York.
 Sandy creek, New York.
 Wilson harbor, New York.

ST. LAWRENCE RIVER.

Grass river, New York.
 Ogdensburg harbor, New York.
 Sister islands, New York.
 Waddington harbor, New York.

NIAGARA RIVER.

Black Rock harbor, New York.
 Tonawanda harbor, New York.

The importance of the improvement of the shipping facilities of these waters is so undoubted that no excuse is needed for giving space to the subject, and in addition to this bare list of the localities that have been improved the following statement takes up this list and shows what has been done under the appropriations:

LAKE SUPERIOR.

AGATE BAY, MINNESOTA.—This is a small indentation in the north shore of the lake, and though it has ample depth of water it is not protected on the southwest or from the reverse swells of the more dangerous storms of the northeast. The little security it afforded, however, was sufficient to warrant the construction of extensive docks for the handling of ore and other merchandise. The commerce soon grew out of all proportion to the size of the harbor, and for its security it was found necessary to supplement the natural protection by artificial means. Two piers projecting from either shore have accordingly been proposed, and though only one has been partly built the tranquillity of the harbor has been greatly increased by it.

ASHLAND HARBOR, WISCONSIN.—This harbor comprises a portion of Chequamegon bay. It was not thoroughly protected from the storm waves which rolled into its mouth, or from the waves generated by the bay itself, and a breakwater has been accordingly built of about 4,700 feet long, in order to give the requisite shelter. This length is hardly sufficient to afford protection to all the wharves of the city, and it is accordingly proposed to extend it 5,000 feet further.

DULUTH HARBOR, MINNESOTA.—The proposed plan to improve this harbor, which lies at the head of Lake Superior, is to cut a canal through the narrow strip of land or sand bar known as Minnesota point, thus uniting the waters of the bay and Lake Superior, to be followed by the construction of a breakwater parallel to this bar. But little has been done, however, on these projects in consequence of a disputed ownership of the land.

EAGLE HARBOR, MICHIGAN.—This harbor was improved not so much to further commerce as to provide a harbor of refuge. The improvements have consisted of cutting a channel of good depth through a ledge which obstructed the entrance to the bay.

GRAND MARAIS HARBOR, MINNESOTA.—On the north shore of Lake Superior there are very few localities where safe anchorage for vessels is to be found, and Grand Marais offers the only place of refuge for vessels during storms between Agate bay and Pigeon river. It is not yet a shipping port of any importance, though it is not distant from the rich deposits of iron ore of the Vermilion range. The improvements have consisted of dredging the harbor basin and the construction of a pier and breakwater.

GRAND MARAIS HARBOR OF REFUGE, MICHIGAN.—This harbor is accessible only for vessels drawing less than 9 feet, but once within the bay there is ample depth to float the largest vessels. As a harbor of refuge it is of pressing necessity to the shipping navigating the lakes in this vicinity, as the many wrecks in the neighborhood bear witness. The project for the improvement of this harbor has been the creation of a safe entrance to the bay for vessels of the largest size, formed by establishing crib piers sheltering a channel of 300 feet in width.

MARQUETTE HARBOR, MICHIGAN.—The improvement of this harbor has consisted in the erection of a breakwater projecting from the shore into the bay a distance of 2,000 feet. The area of commerce is so rapidly increasing, however, that the extension of the breakwater has become a necessity.

ONTONAGON HARBOR, MICHIGAN.—This harbor is formed by the mouth of the river of the same name, and it has fairly deep water, but its mouth is obstructed by a bar. The project of improvement was to build out parallel piers into the lake on either side of the river's mouth with the expectation that the confined current of the river would scour out a good channel through the bar. The expectation, however, has not been fully realized.

PORTAGE LAKE SHIP CANAL, MICHIGAN.—The appropriation of 1886 was for the examination of the Portage Lake and Lake Superior ship canals, with a view to accept the offer of the company to transfer all their rights to the United States for \$350,000. These canals being the water communication across Keweenaw point, Lake Superior, from Keweenaw bay to Lake Superior, in the state of Michigan. The appropriation of 1890 was for the purchase of these canals.

ST. MARYS RIVER AND ST. MARYS FALLS CANAL, MICHIGAN.—The improvement here consists of two parts: first, that of obtaining a 16-foot navigation as an approach to the canal, and second, the construction of the canal itself, about a mile in length, which overcomes by its lockage system a difference of level between lakes Superior and Huron of about 18 feet. So enormous has traffic grown over this route that the old locks have been replaced by a single one 515 feet long and 80 feet wide, which in its turn is to be replaced by a new one 800 feet long and 100 feet wide.

SUPERIOR AND ST. LOUIS BAYS, WISCONSIN.—The natural channel connecting these 2 bays with Lake Superior is at the southeastern extremity of Minnesota point, referred to in the paragraph concerning Duluth. Channels have been dredged through the bays to this outlet, which is protected by crib piers having an aggregate length of 5,650 feet.

LAKES HURON AND ST. CLAIR.

ALPENA HARBOR, THUNDER BAY, MICHIGAN.—The important and rapidly growing city of Alpena is situated at the mouth of Thunder Bay river, from which prior to the commencement of the government improvements there was a navigable channel into the bay of 12 feet depth and variable width. This has been improved to a channel of good navigable width and of 14 feet uniform depth.

AU SABLE RIVER AND HARBOR, MICHIGAN.—Before the beginning of improvements the mouth of Au Sable river was 150 feet wide, with a depth of 5 feet over the bar. The project for the improvement of the harbor has been to obtain a channel between the lake and the harbor of not less than 10 feet in depth and 100 feet in width.

BELLE RIVER, MICHIGAN.—The projects of improvement here have been to construct an ice harbor of refuge and the formation of a channel from the mouth of the river to the lake.

BLACK RIVER, MICHIGAN empties into St. Clair river at Port Huron, Michigan. At and below its mouth, extending beyond the middle of St. Clair river, there is a bar, and the improvement has been the dredging of a channel through this obstruction.

CHEBOYGAN HARBOR, MICHIGAN.—Prior to undertaking any improvement at this harbor only 7 feet of water could be carried across the bar at the mouth of the river, and the project of government improvement has been the formation of a channel 200 feet wide and 14 feet deep.

CLINTON RIVER AND HARBOR, MICHIGAN.—In 1870 the channel over the bar at the entrance to the river afforded a depth of only 3.5 feet, while the depth of the river for some distance above was 10 feet, and the government improvement has consisted of securing a navigable depth of 8 feet through the bar.

DETROIT RIVER, MICHIGAN.—Originally the channel at the entrance to Detroit river could not be depended upon for more than 18 feet of water, the ordinary depth being much affected by the direction of the wind. The government project of improvement has consisted of securing and maintaining a channel 400 feet wide and 20 feet deep.

HARBOR OF REFUGE AT SAND BEACH, MICHIGAN.—Before 1876, vessels when caught in heavy weather near the dangerous Pointe Aux Barques (the southern headland of the mouth of Saginaw bay) were compelled to run a distance of 60 miles and find a refuge in St. Clair river, whence, after the subsidence of the storm, those upward bound had to work their way back again. The project of improvement is for the construction of a harbor of refuge at Sand beach.

ST. CLAIR RIVER FLATS AND CANAL, MICHIGAN.—Before the construction of the canal the St. Clair river emptied into Lake St. Clair through 7 principal mouths or passes, that ordinarily used by vessels being known as the south channel, having a minimum depth of a little less than 11 feet. The St. Clair Flats canal was projected in 1866, with a view to obtaining a straight channel 13 feet deep and 330 feet wide across the flats east of the mouth of this south channel, the work being finished in 1871. The canal is bounded on each side by a dike 7,221 feet long, or an aggregate of 14,442 feet. In 1873 the channel was deepened to 16 feet by dredging for a width of 200 feet, the width being thus limited by the fact that the slope of the dikes did not admit of dredging to 16 feet for the full width of 300 feet. The present project of improvement is to protect the face of the dikes in such a way that the full width of the channel may be dredged to a uniform depth of 20 feet.

SAGINAW RIVER, MICHIGAN.—Before any improvements were made the entrance to this river was obstructed by a bar about a mile from the shore; and thence to the head of the river, a distance of about 16 miles, the channel was obstructed by a number of other bars. The project of improvement was to dredge out a channel which would have a uniform depth of 10 feet.

SEBEWAING HARBOR, MICHIGAN lies at the mouth of the river of the same name, and the improvements have consisted of the formation and protection of a navigable channel from it into Saginaw bay.

LAKE MICHIGAN.

AHNAPEE HARBOR, WISCONSIN, is a small artificial harbor constructed for local purposes in the mouth of Ahnapee river; and has been formed by the usual process of dredging out a channel and the erection of protecting piers.

BLACK LAKE HARBOR, MICHIGAN, was to have been formed by the completion of a protected channel connecting it with Lake Michigan, but no adequate appropriations for the purpose have been secured. It has a length of 5 miles, an average width of about half a mile, and a navigable depth from end to end of only 4 fathoms. The town of Holland, a thriving place with a population of 3,945, is built at the head of the lake.

CALUMET HARBOR AND RIVER, ILLINOIS.—The object of this improvement was to provide a deep entrance to Calumet river and the port of South Chicago, in order both to increase the commercial facilities of that place and to give relief to Chicago itself.

CEDAR RIVER (GREEN BAY), MICHIGAN.—The harbor of Cedar river is located in the mouth of the river itself, and the improvement of the locality has been effected by dredging out and protecting a navigable channel from the harbor into Green bay.

CHARLEVOIX HARBOR, MICHIGAN, lying between Grand and Little Traverse bays, is formed by Round lake, a picturesque body of water about half a mile long and a quarter of a mile wide, upon the banks of which the town is built. Adjoining it on the land side is Pine lake, and the official project of improvement provides for a navigable channel of good dimensions from Lake Michigan into Round lake and thence into Pine lake.

CHICAGO HARBOR, ILLINOIS.—The improvements of Chicago harbor have consisted, first, of the formation of the outer harbor or basin by including a portion of Lake Michigan just south of and adjoining the entrance to Chicago river, for the purpose of increasing the harbor facilities of the port and to give relief to the overcrowded river, and, second, the construction of an exterior breakwater to shelter the entrance to Chicago river and the outer harbor from northerly storms, and to form a sheltered area or harbor of refuge at the southern end of Lake Michigan. A subsidiary project has been the protection of the entrance to Chicago river by piers.

FOX RIVER (MOUTH OF), WISCONSIN.—This river empties into Green bay. The improvements form a part of the extensive project mentioned under the head of Green Bay harbor, Wisconsin.

FRANKFORT HARBOR, MICHIGAN, is really the little Lake Aux Bees Seies, lying south of Point Betsey, one of the important headlands on the east coast. Separating the little lake from the big one lies a sand spit, and the project of improvement has been to cut a channel through this obstruction.

GRAND HAVEN HARBOR, MICHIGAN, is both a harbor of local importance and of special status as a harbor of refuge for general commerce. The improvements have been the confinement of the volume of water flowing out of Grand river, thus providing an entrance of good width and depth.

GRAND RIVER, MICHIGAN.—The projected work here is that of improving the navigation of the river from Grand Rapids to its mouth at Grand Haven.

GREEN BAY HARBOR, WISCONSIN.—The improvements of Green bay, which lies at the mouth of Fox river, form a part of the original and much more extensive project which was to secure a cheap route of transportation from Mississippi river to the Great Lakes, and also to the Atlantic seaboard via Wisconsin river, Lake Winnebago, Neenah river, Fox river, and Green bay. All the items of appropriation which are set down for these various localities may be considered as having been expended in the survey for or the furtherance of this comprehensive project.

KENOSHA HARBOR, WISCONSIN, is situated at the mouth of Pike creek, and the project of improvement is the usual one of the formation and protection of a navigable channel between the harbor and Lake Michigan.

KEWANEE HARBOR, WISCONSIN, is situated at the mouth of Kewanee river, the improvements being of that character which have been already once or twice described.

LAKE WINNEBAGO, WISCONSIN.—The improvements for this lake form a part of the extensive project mentioned under the head of Green Bay harbor, Wisconsin.

LA PLAISANCE BAY, MICHIGAN.—The nineteen thousand and odd dollars set down as the appropriations for the improvement of this place were expended from 1826 to 1836, and were used to form and protect a safe entrance to the bay. The bay is of no present importance.

LUDINGTON HARBOR, MICHIGAN.—Ludington is built about the lower end of Pere Marquette lake, which is 9 or 10 miles long and half a mile in average width. A harbor of refuge has been established in the construction of protecting piers from Lake Michigan to deep water in the inner lake.

MANISTEE HARBOR, MICHIGAN, is on Manistee lake, and the improvement has consisted of enlarging and protecting the channel between it and Lake Michigan.

MANISTIQUE HARBOR, MICHIGAN.—The improvement here has been of that kind so often described, to secure and maintain a navigable channel from Lake Michigan to the mouth of Manistique river where the harbor of Manistique is situated.

MANITOWOC HARBOR, WISCONSIN.—A similar project of improvement.

MENOMINEE HARBOR, WISCONSIN.—A similar project of improvement.

MICHIGAN CITY, INDIANA.—The appropriation acts make a distinction between the outer harbor and the inner harbor, separate provision being made for each. The inner harbor, where all the shipping business is done, and which in fact furnishes all the harbor facilities that exist, consists of Trail creek, which winds through the town and which has been dredged landward for a distance of nearly 1.5 miles from the mouth, where piers on each side 100 feet apart projecting into the lake protect the entrance. The outer harbor, so called, consists of several works constructed at different dates and designed for the protection of the general lake commerce, in view of the great development of the shipping industries and the exposed location of the harbor at the head of the lake.

MILWAUKEE BAY AND HARBOR, WISCONSIN.—So far as the bay is concerned the project of improvement has been that of securing anchorage for vessels engaged in the general commerce of the lakes by inclosing its northern section within a breakwater, while the improvement of Milwaukee harbor has been that of gaining and maintaining a navigable channel from Lake Michigan into Milwaukee river, which is really the inner harbor of Milwaukee.

MUSKEGON HARBOR, MICHIGAN.—Muskegon is the principal coast city on the east shore of the lake and the leading one in population and products. It is situated on Lake Muskegon, a body of water about 5 miles long and 1.5 miles in width, into which Muskegon river flows and thence to Lake Michigan through a natural channel maintained by an overflow. The official project had in view the extension of piers and revetments to such a distance into Lake Michigan as to secure a 15-foot navigation, and this result has approximately been attained, although additional development is needed to the works to counteract the formation of the bar outside the entrance. Muskegon is claimed by local authorities to be the largest lumber manufacturing town in the United States, its annual products being 600,000,000 feet of lumber, 500,000,000 shingles, and 175,000,000 lath.

NEW BUFFALO HARBOR, MICHIGAN.—The improvements of this harbor, which lies just above the Indiana state line, were all made between 1852 and 1872, and were of the usual character belonging to lake harbors.

OCONTO HARBOR, WISCONSIN, lies at the mouth of Oconto river, which empties into Green bay, and the project of improvement has been to secure a navigable channel from Green bay up Oconto river to the city.

PENSAUKEE HARBOR, WISCONSIN.—The conditions here are so similar to those of Oconto that they need not be detailed.

PENTWATER HARBOR, MICHIGAN.—The town of Pentwater is built at the lower end of Pentwater lake, which is about 2.5 miles long and half a mile wide. The official project connects the inner lake with Lake Michigan by a 12-foot channel protected by piers and revetments 150 feet apart. As in nearly all similar cases, the full depth has not been reliably secured or maintained, the wave action in Lake Michigan tending to the deposit of sand between the piers, while the piers themselves, from their comparatively open character, permit the wash and drift of sand through them from the beaches.

PETOSKEY HARBOR, MICHIGAN.—Petoskey is a small village of 2,872 people, occupying a picturesque site on the bluffs overlooking Little Traverse bay, and near its head. The bluffs descend almost vertically to the narrow gravel beach of the bay, which here is fully exposed to the winds from the north and northeast. The present and prospective business of the place is small, and it is chiefly noted as a popular summer resort and for its fine specimens of agate, while, being at the terminus of an important railroad, it is a point of departure to numerous like resorts in the neighborhood of the straits of Mackinaw. During high winds from the north and west these vessels find it difficult to make a landing at the one small dock of Petoskey, and at times find it impossible to do so, when they seek shelter in the commodious natural harbor 3 miles across the bay. This harbor, known as Harbor Springs, is one of the harbors of refuge on the lakes, and therefore the project of building a harbor of refuge at Petoskey has been adversely reported on and the construction of a breakwater only has been recommended.

PORT WASHINGTON, WISCONSIN, consists of two small interior and connected basins, and the object of the improvement has been to secure a navigable channel entrance from Lake Michigan by parallel piers extending from the shore line to 10 feet of water in the lake.

PORTAGE LAKE HARBOR OF REFUGE, MICHIGAN, is a considerable body of water, 3.5 miles long by 1 mile in width, situated nearly midway of the 55 miles of concave coast between Point Betsey and Grande Pointe Au Sable. There is no harbor south of Frankfort in the length of this stretch except the Manistee entrance, which has neither the width nor depth adequate to make it available as a harbor of refuge for general commerce, and

many disasters to shipping have occurred. For this reason the official project for Portage lake, under which appropriations have been made since 1879, provided for the construction of a passage through the narrow beach separating Portage lake from Lake Michigan, with a width of 400 feet and a depth of 18 feet, dimensions which are the same as at Grand Haven and which would render the harbor suitable for all lake vessels needing shelter.

RACINE HARBOR, WISCONSIN.—Both the city and harbor of Racine are situated at the mouth of Root river, and the object of the improvements has been the construction and maintenance of a channel 18 feet deep and 160 feet wide from the harbor into the lake.

ST. JOSEPH HARBOR AND RIVER, MICHIGAN.—Where St. Joseph and Pawpaw rivers unite the water area extends into a basin about half a mile in length by one-sixth of a mile in width, which is designated St. Joseph harbor, and as such has been under improvement by the United States since 1836, partly for the benefit of local commerce, but more especially as a harbor of refuge for general commerce. The official project has provided for an entrance with a depth of 16 feet, protected by piers on each side, with an average width of 270 feet.

SAUGATUCK HARBOR, MICHIGAN, is formed at the mouth of Kalamazoo river, and the improvements have been of the usual nature described in speaking of those other localities where the necessity has existed for maintaining a navigable channel.

SHEBOYGAN HARBOR, WISCONSIN, is formed at the mouth of Sheboygan river, and the improvements are those of forming and maintaining a navigable channel of good dimensions from the lake to the harbor.

SOUTH HAVEN HARBOR, MICHIGAN.—The official project for this harbor, which is the mouth of Black river where the town of South Haven is situated, calls for a 12-foot navigable channel with an extreme width of 108 feet.

STURGEON BAY, WISCONSIN.—The object of the government improvements here has been to form a harbor of refuge inclosing the Lake Michigan entrance to Sturgeon Bay and Lake Michigan ship canal, and also to afford a safe entrance to the canal in rough weather.

TWO RIVERS HARBOR, WISCONSIN, is situated at the mouth of the Twin rivers, and the improvements have been those of the usual kind described as being necessary under similar conditions.

WAUKEGAN HARBOR, ILLINOIS.—The character of the improvement of this harbor is somewhat different from that of other points on the Great Lakes. Most of the improvements have consisted in deepening the mouths of streams emptying into the lake, but at Waukegan there is only a creek emptying into the lake, and it is of no importance for harbor purposes. The project of improvement here, therefore, has been to construct an exterior basin of sufficient capacity to meet the requirements of local trade by inclosing a portion of Lake Michigan within sheltering piers.

WHITE RIVER HARBOR, MICHIGAN.—White lake is about 4.5 miles long by three-fourths of a mile wide, and the towns of Whitehall and Montague are built on its upper or eastern end, where White river enters the lake and discharges through it into Lake Michigan. The official project connects the 2 lakes by a 12-foot channel between piers and revetments 200 feet apart.

LAKE ERIE.

ASHTABULA HARBOR, OHIO.—The original project for the improvement of this harbor was adopted in 1826, at which time there was a depth of only 2 feet of water on the bar. As the result of this improvement there is now a protected channel of 17 feet between the harbor and the lake.

BLACK RIVER HARBOR, OHIO.—Black river, Ohio, is formed by two branches nearly equal in size which unite about 8 miles from the town of Lorain, where the river empties into Lake Erie. The project of improvement, commenced in 1828 and maintained from time to time as the demands of commerce called for, provides for a protected channel between the harbor and the lake 16 feet in depth.

BUFFALO HARBOR, NEW YORK.—Up to 1868 Buffalo harbor and Buffalo creek may be considered to have been synonymous terms. The earliest record of which there is any trace as to the condition of this harbor was in 1818, at which time the mouth of the creek was most of the year closed by a gravel bar which was cut out by freshets and then closed up again. From that time a number of improvements have been carried out until to-day the present works consist of (1) a pier on the north side of Buffalo creek, known as the North pier; (2) a pier on the south side of the creek, known as the South or Lighthouse pier; (3) a detached breakwater, to be when finished 7,800 feet long, with a shore arm, to be when finished 4,100 feet long; (4) a pile pier, built for a sand catch and eventually to form a part of the shore arm of the breakwater; (5) a sea wall of masonry to protect the shore from the waves of the lake.

CATTARAUGUS CREEK, NEW YORK.—The improvements here, all of which were effected between the years 1826 and 1836, were simply for the improvement of the harbor, which is really the mouth of the creek.

CLEVELAND HARBOR, OHIO, is situated at the mouth of Cuyahoga river. The improvements, which are the outcome of many projects, have resulted in a protected channel of good depth, 200 feet wide, running out to the depth of 16 feet in the lake, and the formation of a harbor of refuge.

CONNEAUT HARBOR, OHIO, which lies at the mouth of the creek of the same name, has been improved by the removal of a bar which obstructed navigation and by the formation of a protected channel.

CUNNINGHAM CREEK, OHIO.—The work of improvement at this place has been of the same nature as that described for Conneaut harbor.

DUNKIRK HARBOR, NEW YORK.—The improvement of this harbor was commenced in 1827, and the original project was much the same as that of the existing improvements, which comprise the formation of an artificial harbor in front of the city.

ERIE HARBOR, PENNSYLVANIA.—The object of the improvement here has been to protect the harbor from severe winds from the east and northeast, and to obtain and maintain a channel between deep water in the harbor and the open lake 16 feet deep at low water and of good navigable width.

GRAND RIVER HARBOR (FAIRPORT), OHIO, which is officially known as Fairport, has been improved by the construction and maintenance of a protected channel 200 feet wide through a sand bar. Fairport is now the third harbor on the list of Lake Erie harbors in the amount of ore received, and owing to the increased size of vessels at present in use on the lake in this traffic an increased depth to 18 feet is stated to be necessary.

HURON RIVER AND HARBOR, OHIO.—The improvements here are precisely of the same character as those that have been effected at all other localities where the entrance to the harbor has been obstructed by a bar.

MONROE HARBOR, MICHIGAN, is situated at the extreme western end of Lake Erie, about 1.5 miles west of the mouth of Raisin river, and about 3.5 miles from the town of Monroe. The improvements were commenced here in 1835, when Raisin river was considered an important stream and Monroe a place of increasing commerce. The work done has consisted in straightening the river, making direct connection with Lake Erie through a sand peninsula by a channel 4,000 feet long and 100 feet wide.

PORT CLINTON, OHIO, is situated at the mouth of Portage river, and the improvements have consisted of the same work of making and maintaining a channel which has been so frequently described.

PORTLAND HARBOR, NEW YORK.—The improvements here were all carried out from 1836 to 1844.

ROCKY RIVER HARBOR, OHIO.—The improvements of Rocky River harbor have consisted of the formation and protection of a navigable channel from the mouth of the harbor to deep water in the lake.

ROUGE RIVER, MICHIGAN, is somewhat remarkable for the depth of the water in its lower reaches, a channel of 11 feet over the bar at its mouth being in existence, and the improvements have consisted in dredging out the stream up to its junction with Detroit river.

SANDUSKY CITY HARBOR AND SANDUSKY RIVER, OHIO.—Sandusky bay empties into or rather opens on Lake Erie about 40 miles from its western extremity. It has a natural harbor containing an area of about 22.5 miles, a depth of from 8 to 12 feet, and is protected on the north and northwest by a long, narrow peninsula, and on the northeast by Cedar point. The project of improvement has included the construction of a channel 200 feet wide and 15 feet deep through the outer bar and up to the city front. The Sandusky river empties into Sandusky bay about 14.5 miles from Cedar point, and the improvement of the river has been the dredging out of a 9-foot channel from the city of Fremont, the head of navigation, 17 miles from the mouth of the river, to a 9-foot depth in the bay.

TOLEDO HARBOR, OHIO.—The city of Toledo is situated at the mouth of Maumee river, which empties into Maumee bay about 7 miles from the deep water of Lake Erie. The improvements here have consisted mainly of the construction and maintenance of a straight channel from the mouth of the river to deep water in Lake Erie.

VERMILION RIVER, OHIO.—Vermilion river, the mouth of which constitutes Vermilion harbor, empties into Lake Erie, about 20 miles to the east of Sandusky city, and the improvements have resulted in the construction of a channel of good depth between the harbor and lake.

LAKE ONTARIO.

BLACK RIVER (SACKETTS HARBOR), NEW YORK.—The improvements here may be said to be for the mouth of this river, which empties into Sacketts harbor.

CHARLOTTE HARBOR, NEW YORK.—The improvements here have resulted in securing a navigable channel at the mouth of Genessee river.

GREAT SODUS BAY, NEW YORK.—The improvements here have resulted in securing a navigable channel of 15 feet in depth from Lake Ontario to the bay.

LITTLE SODUS BAY, NEW YORK.—The plan of improvement here has been the same as that described at Great Sodus bay.

OAK ORCHARD HARBOR, NEW YORK.—A protected channel 200 feet wide and 12 feet deep has been secured as the result of the government improvements here.

OLCOTT HARBOR, NEW YORK.—The improvements here have resulted in obtaining a channel 11 feet deep between Lake Ontario and the deep water in Eighteen Mile creek, where Olcott harbor lies.

OSWEGO HARBOR, NEW YORK.—The object of the improvements here has been to provide a basin of sufficient size and depth for the needs of commerce at the mouth of Oswego river and to secure and maintain a navigable channel into said basin and river from the lake.

PORT ONTARIO HARBOR, NEW YORK.—The improvements at this harbor, which lies at the mouth of Salmon river, were of little importance, and were all effected between the years 1836 and 1844.

PULTNEYVILLE HARBOR, NEW YORK.—The improvements here differ somewhat from those so often described in that they had for their object the formation of a harbor by protecting breakwaters.

SACKETTS HARBOR, NEW YORK.—The improvements here may be said to embrace both those which have directly affected the harbor and those which have been applied to Black river, which empties into the harbor. The harbor improvements have consisted of dredging out a large area to a good depth and the checking of drifting material, while the improvements of the river have consisted of deepening and maintaining a navigable channel.

SANDY CREEK, NEW YORK.—The appropriations made for this place were for the survey of its mouth with a view to constructing a harbor at this place. The project, however, was not carried into effect.

WILSON HARBOR, NEW YORK, is situated at the mouth of Twelve Mile creek, and the object of the improvement has been to secure a 12-foot channel between it and Lake Ontario.

ST. LAWRENCE RIVER.

GRASS RIVER, NEW YORK.—The project of the improvement here contemplated the formation of a channel from St. Lawrence river to Massena village, a distance of 7 miles, with a minimum width of 40 feet and a least depth of about 4 feet.

OGDENSBURG HARBOR, NEW YORK.—When operations were commenced at this harbor in 1868 the channel afforded depths of 5 to 12 feet only, and now there are 3 channels from deep water in St. Lawrence river to the nearest docks or wharves, in which water from 15 to 16 feet deep is afforded, and a channel from 12 to 15 feet deep has been made along the city front.

SISTER ISLANDS, NEW YORK.—This appropriation was made by the act of 1890 for the improvement of the shoal between Sister islands and the Cross-over light.

WADDINGTON HARBOR, NEW YORK.—The appropriations for the improvement of Waddington harbor closed in 1881, by which time the project of opening a channel through a bar at the head of the river which forms Waddington harbor was completed.

NIAGARA RIVER.

BLACK ROCK HARBOR, NEW YORK.—The improvements of Black Rock, which lies at the outlet of Lake Erie, were conducted between the years 1829 and 1834, and consisted of the dredging out of a navigable channel of good dimensions.

TONAWANDA HARBOR, NEW YORK.—The improvement here has embraced the formation of a navigable channel from the entrance of Niagara river at Lake Erie to the north end of Tonawanda river, the channel to be 400 feet wide and 18 feet in depth.

INCREASE AND IMPROVEMENT.

From the figures given it will have been seen that the total cost of all the harbor and river improvements up to the close of 1890 amounted to \$40,912,975, but, large as this sum is, it has been contended that the saving effected by the transportation through the lake marine more than pays back this amount to the country in a single season. The calculation made in support of this argument runs somewhat as follows:

According to the computation made by Mr. Keep the average distance over which freight was carried during 1889 was 566 miles. It will not, therefore, be going far outside the probabilities to assume that this distance was the average also for 1890, and on that assumption the total ton-mileage for 1890 was 18,849,681,384 ton-miles, while that for 1889 was 15,542,507,160.

According to the various reports of the principal transportation agencies freight rates on these waters during the year 1890 varied from 3.5 mills per ton-mile to 0.3 mill per ton-mile, the former rate being received on certain high class "package freight" and the latter being the rate on coal over a certain route. The great bulk of the "gross freight" was carried at less than 1 mill per ton-mile, and it is probable that the average rate on all freight was about 1.1 mills per ton-mile. Assuming, however, that it was as high as 1.2 mills, the cost of the total water transportation for 1890 was \$22,619,618.

An instructive lesson in comparative statistics is gathered from the fact that the total ton mileage of all the railroads in the United States for the year ending June 30, 1890, was 76,207,047,298 ton-miles, so that the ton-mileage of the Great Lakes and river St. Lawrence for the same year being, as has been seen, 18,849,681,384 ton-miles, the lake ton-mileage was 24.73 per cent of the ton-mileage of all the railroads of the United States. In

other words, it would have required 24.73 per cent of the entire railway freight equipment of the railroads in the United States to have transported by rail the cargoes carried by lake vessels in 1890, and this, it must be remembered, is based on the calculation that each of the transportation agencies was employed during the same period of time, while as a matter of fact the railroads ran for 12 months and the lake season extended over but 234 days, or less than 8 months.

REDUCTION IN FREIGHT RATES.

The question of reduction in freight rates is indeed a most interesting one, and it is especially so in the case of grain. In 1859, for instance, it cost an average of 15.75 cents to carry a bushel of corn from Chicago to Buffalo by lake. In 1871 the rate had fallen to 7.50 cents per bushel, while in 1890 it only cost 1.88 cents per bushel. In 1867 it cost an average of \$4.25 to carry a ton of iron from Escanaba to Erie, in 1870 it cost \$2.50 for the same service, while in 1890 the rate was as low at one time as \$0.55, with an average of \$0.82 per ton.

A valuable record of the most representative freight rates has been prepared by Mr. W. A. Livingstone, and will be found embodied in the subjoined tables. The titles of these tables are, generally speaking, sufficiently indicative of the matter presented, but one or two explanations are needed, which can be better given in this prefatory manner than in the form of footnotes. It should be understood, for example, that the rate of any previous date held good until the succeeding date when the new rate was made; that the ore rates in the first table include the unloading of the ore, paid by the vessel, and are the rates per gross ton, and that the averages given in all cases are the calculated averages of all the daily rates, and are not the average rates at which the freight was carried:

ORE RATES FROM THE PORTS NAMED TO LAKE ERIE PORTS.

1890

| DATES. | Escanaba. | Marquette. | Ashland. | DATES. | Escanaba. | Marquette. | Ashland. |
|----------------|-----------|------------|----------|-----------------------------|-----------|------------|----------|
| April 10 | \$1.00 | \$1.25 | \$1.35 | August 15 | \$0.85 | \$1.00 | \$1.00 |
| April 15 | 0.90 | 1.20 | 1.30 | October 1 | 0.85 | 1.00 | 1.10 |
| May 5 | 0.90 | 1.15 | 1.25 | October 15 | 0.90 | 1.00 | 1.10 |
| May 20 | 0.85 | 1.15 | 1.20 | November 4 | 1.00 | 1.10 | 1.15 |
| May 29 | 0.85 | 1.10 | 1.20 | November 12 | 1.15 | ..... | 1.30 |
| July 20 | 0.85 | 1.10 | 1.15 | November 25 | 1.15 | ..... | 1.70 |
| July 24 | 0.85 | 1.10 | 1.10 | | | | |
| July 30 | 0.85 | 1.05 | 1.10 | Average daily rates | 0.890 | 1.072 | 1.156 |
| August 9 | 0.85 | 1.05 | 1.05 | Season contract rates | 1.100 | 1.250 | 1.350 |

1891

| | | | | | | | |
|-----------------|--------|--------|--------|---------------------------------------|--------|--------|--------|
| May 7 | \$0.70 | ..... | \$0.90 | August 29 | \$0.85 | \$1.00 | \$1.10 |
| May 11 | 0.65 | ..... | 0.90 | September 1 | 0.90 | 1.05 | 1.15 |
| May 20 | 0.60 | \$0.80 | 0.90 | September 4 | 0.95 | 1.10 | 1.15 |
| May 25 | 0.55 | 0.80 | 0.90 | September 5 | 1.00 | 1.10 | 1.15 |
| June 10 | 0.55 | 0.80 | 0.80 | September 22 | 1.05 | 1.20 | 1.30 |
| June 22 | 0.60 | 0.80 | 0.80 | September 26 | 1.00 | 1.20 | 1.30 |
| June 23 | 0.65 | 0.80 | 0.80 | September 29 | 0.95 | 1.15 | 1.30 |
| June 24 | 0.65 | 0.90 | 0.90 | October 1 | 0.95 | 1.10 | 1.30 |
| July 7 | 0.65 | 0.90 | 1.00 | October 3 | 0.90 | ..... | ..... |
| July 14 | 0.70 | 0.95 | 1.00 | October 5 | 0.85 | 1.00 | 1.20 |
| July 20 | 0.75 | 1.00 | ..... | October 7 | 0.80 | 1.00 | 1.10 |
| July 23 | 0.80 | 1.00 | ..... | October 10 | 0.75 | 0.95 | 1.00 |
| July 24 | 0.85 | 0.95 | 1.05 | October 12 | 0.75 | 0.85 | 0.95 |
| July 30 | 0.85 | 1.05 | 1.10 | October 14 | 0.75 | 0.95 | 1.00 |
| July 31 | 0.90 | 1.10 | 1.20 | October 22 | 0.80 | 1.00 | 1.10 |
| August 3 | 0.95 | 1.15 | 1.25 | October 30 | 0.90 | 1.15 | 1.40 |
| August 4 | 1.10 | 1.25 | 1.35 | November 4 | 1.00 | 1.25 | 1.50 |
| August 6 | 1.00 | 1.10 | 1.20 | November 6 | 1.20 | 1.30 | 1.50 |
| August 8 | 0.95 | 1.10 | 1.15 | November 18 | 1.30 | ..... | ..... |
| August 12 | 0.90 | 1.10 | 1.10 | November 19 | 1.35 | ..... | ..... |
| August 14 | 0.95 | 1.10 | 1.15 | | | | |
| August 15 | 1.00 | 1.15 | 1.15 | Average daily rates | 0.825 | 1.004 | 1.070 |
| August 17 | 0.90 | 1.10 | 1.15 | Season contracts made on June 4 | 0.650 | 0.900 | 0.900 |
| August 20 | 0.90 | 1.05 | 1.15 | | | | |

TRANSPORTATION ON THE GREAT LAKES.

285

RATE OF FREIGHT, PER BUSHEL, ON CORN FROM CHICAGO TO BUFFALO.

1890

| | CENTS. | | CENTS. | | CENTS. |
|---------------|--------|----------------|--------|-------------------|--------|
| March 7..... | 2.875 | May 27..... | 1.500 | September 5..... | 1.500 |
| March 14..... | 3.250 | June 5..... | 1.750 | September 12..... | 1.750 |
| March 25..... | 3.500 | June 10..... | 2.000 | September 29..... | 2.000 |
| April 3..... | 3.250 | June 27..... | 2.250 | October 14..... | 1.875 |
| April 5..... | 2.875 | June 28..... | 2.125 | October 16..... | 1.500 |
| April 11..... | 2.500 | July 8..... | 2.000 | October 22..... | 1.250 |
| April 14..... | 2.250 | July 23..... | 2.875 | October 25..... | 1.500 |
| April 15..... | 2.000 | July 24..... | 1.500 | November 6..... | 1.250 |
| April 25..... | 1.750 | July 25..... | 1.750 | November 18..... | 1.500 |
| April 26..... | 1.500 | July 30..... | 1.500 | November 19..... | 1.750 |
| April 28..... | 1.250 | July 31..... | 1.000 | November 20..... | 1.500 |
| April 30..... | 1.500 | August 1..... | 1.250 | November 21..... | 2.000 |
| May 2..... | 1.750 | August 9..... | 1.375 | November 28..... | 3.000 |
| May 3..... | 1.500 | August 16..... | 1.250 | December 3..... | 3.000 |
| May 20..... | 1.250 | | | | |

1891

| | CENTS. | | CENTS. | | CENTS. |
|---------------|--------|-------------------|--------|------------------|--------|
| April 10..... | 2.000 | August 7..... | 2.750 | October 5..... | 1.750 |
| April 17..... | 1.750 | August 10..... | 2.500 | October 23..... | 2.000 |
| May 2..... | 1.500 | August 11..... | 2.250 | October 26..... | 2.250 |
| May 8..... | 1.250 | August 14..... | 2.500 | October 30..... | 2.500 |
| May 9..... | 1.125 | September 2..... | 2.750 | October 31..... | 2.750 |
| May 13..... | 1.000 | September 4..... | 3.000 | November 4..... | 3.250 |
| June 29..... | 1.250 | September 10..... | 3.250 | November 5..... | 3.750 |
| July 7..... | 1.375 | September 12..... | 3.000 | November 6..... | 4.000 |
| July 13..... | 1.500 | September 15..... | 3.250 | November 12..... | 3.750 |
| July 14..... | 1.750 | September 25..... | 3.000 | November 19..... | 4.500 |
| July 28..... | 2.250 | September 28..... | 2.750 | November 21..... | 4.250 |
| July 30..... | 2.750 | September 30..... | 2.500 | November 28..... | 4.500 |
| July 31..... | 3.000 | October 3..... | 2.250 | December 2..... | 4.500 |

AVERAGES OF DAILY RATES, PER BUSHEL, FOR 6 YEARS.

| | CENTS. | | CENTS. | | CENTS. |
|-----------|--------|-----------|--------|-----------|--------|
| 1886..... | 3.40 | 1888..... | 2.50 | 1890..... | 1.88 |
| 1887..... | 3.90 | 1889..... | 2.25 | 1891..... | 2.13 |

STATISTICS OF TRANSPORTATION.

RATE OF FREIGHT, PER BUSHEL, ON WHEAT FROM DULUTH TO BUFFALO.

1890

| | CENTS. | | CENTS. | | CENTS. |
|----------------|--------|---------------|--------|--------------------|--------|
| March 28 | 3.750 | June 13 | 2.250 | September 15 | 2.500 |
| April 11 | 3.500 | June 14 | 2.000 | September 22 | 2.750 |
| April 23 | 3.250 | June 21 | 2.500 | November 15 | 3.000 |
| May 7 | 3.000 | June 24 | 2.750 | November 22 | 4.000 |
| May 10 | 2.875 | June 27 | 2.500 | November 24 | 4.500 |
| May 13 | 3.000 | July 8 | 2.750 | November 26 | 5.000 |
| June 3 | 2.750 | July 10 | 2.500 | November 28 | 5.500 |
| June 5 | 2.500 | July 30 | 2.250 | | |

1891

| | CENTS. | | CENTS. | | CENTS. |
|----------------|--------|--------------------|--------|-------------------|--------|
| March 16 | 2.875 | August 1 | 3.000 | October 26 | 4.000 |
| March 18 | 2.750 | August 5 | 3.500 | November 2 | 4.250 |
| March 24 | 2.500 | August 6 | 3.250 | November 3 | 5.000 |
| April 22 | 2.250 | September 8 | 3.500 | November 5 | 5.250 |
| May 9 | 2.000 | September 10 | 3.750 | November 6 | 6.000 |
| May 16 | 1.750 | September 15 | 4.000 | November 7 | 7.000 |
| May 18 | 1.500 | September 28 | 3.500 | November 9 | 7.500 |
| May 20 | 1.250 | October 6 | 3.250 | November 19 | 8.000 |
| June 9 | 1.750 | October 8 | 3.000 | November 20 | 8.500 |
| June 12 | 1.500 | October 10 | 2.500 | November 21 | 9.250 |
| June 13 | 2.000 | October 19 | 2.750 | November 23 | 9.500 |
| July 7 | 2.250 | October 20 | 3.000 | November 25 | 9.250 |
| July 13 | 2.500 | October 21 | 3.500 | November 28 | 9.250 |

RATES, PER NET TON, FOR CARRYING COAL FROM BUFFALO TO THE PORTS NAMED.

| 1890 | | | | 1891 | | | |
|--------------------|---------|------------|----------|--------------------|---------|------------|----------|
| DATES. | Duluth. | Milwaukee. | Chicago. | DATES. | Duluth. | Milwaukee. | Chicago. |
| April 16 | \$0.40 | \$0.40 | \$0.40 | April 14 | \$0.40 | \$0.50 | \$0.60 |
| April 21 | 0.35 | 0.50 | 0.50 | May 11 | 0.40 | 0.60 | 0.60 |
| April 30 | 0.35 | 0.50 | 0.60 | July 18 | 0.40 | 0.50 | 0.50 |
| May 5 | 0.40 | 0.50 | 0.60 | July 20 | 0.30 | 0.50 | 0.50 |
| May 21 | 0.35 | 0.50 | 0.60 | August 12 | 0.40 | 0.50 | 0.50 |
| June 13 | 0.40 | 0.50 | 0.60 | August 28 | 0.30 | 0.50 | 0.50 |
| September 3 | 0.30 | 0.50 | 0.60 | September 2 | 0.30 | 0.40 | 0.40 |
| November 3 | 0.40 | 0.60 | 0.75 | September 15 | 0.25 | 0.40 | 0.40 |
| November 9 | 0.60 | 0.60 | 0.75 | September 26 | 0.25 | 0.50 | 0.50 |
| November 11 | 0.75 | 0.75 | 0.75 | October 28 | 0.25 | 0.50 | 0.60 |
| November 28 | 0.75 | 0.75 | 1.00 | October 29 | 0.25 | 0.60 | 0.60 |
| | | | | November 10 | 0.10 | 0.60 | 0.60 |
| | | | | November 18 | 0.10 | 0.75 | 0.75 |
| | | | | November 28 | 0.10 | 1.00 | 0.75 |
| Average rate | 0.394 | 0.521 | 0.611 | Average rate | 0.318 | 0.545 | 0.537 |

GENERAL RESULTS.

In the progress of this text the history of transportation on the Great Lakes and river St. Lawrence has been traced from its early beginnings to the year 1890; the comparative statistics of the decade of 1880 and 1889, inclusive, have been treated with some fullness, and much space has been devoted to a review of the industry in its positive form of a report for the period covered by the Eleventh Census. The matter can therefore well be brought to the review standpoint by a consideration of the general results of the traffic, results which have a strong social and political as well as commercial bearing. The extraordinary growth of the country is certainly one of the most striking features in the history of the United States, and it is also certain that one of the pre-eminent factors in making this growth possible has been the rapid extension of the water transportation systems of the Mississippi valley and the lacustrine system. It will show a closer parallelism between the increase of the importance of lake traffic and that of population, if one considers the growth of population in the cities found either directly on the lake shore or situated within a 50-mile zone encircling the lakes. In the whole of the United States there are 448 cities and towns having a population of 8,000 and over, and of these 448 no less than 204 are found in the 8 states to which reference has been made, while within the zone which has been outlined there lie 57 of such cities. The population of the 448 large cities of the United States was 18,284,385 in 1890, that of the 204 cities in the 8 lake states was 10,137,747, while that of the 57 cities lying within the 50-mile zone was 3,184,357, which figures, together with those showing the increase per city for the census year 1880 over that of 1890, are shown in the following table:

TABLE V.—STATEMENT SHOWING THE POPULATION IN 1880 AND 1890 OF CITIES OF 8,000 INHABITANTS AND OVER, LOCATED WITHIN A RADIUS OF 50 MILES OF THE GREAT LAKES AND ST. LAWRENCE RIVER.

| LOCALITIES. | 1890 | 1880 | LOCALITIES. | 1890 | 1880 |
|--|-----------|---------|--|---------|---------|
| Lake Superior..... | 75,344 | 14,212 | Lake Michigan—Continued. | | |
| Ashland, Wisconsin..... | 9,956 | ..... | Muskegon, Michigan..... | 22,702 | 11,262 |
| Duluth, Minnesota..... | 33,115 | 3,483 | Oshkosh (Lake Winnebago), Wisconsin..... | 22,836 | 15,748 |
| Ishpeming, Michigan..... | 11,197 | 6,039 | Racine, Wisconsin..... | 21,014 | 16,031 |
| Marquette, Michigan..... | 9,093 | 4,690 | Sheboygan, Wisconsin..... | 16,359 | 7,314 |
| Superior, Wisconsin..... | 11,983 | ..... |  |  |  |
| Lakes Huron and St. Clair..... | 337,078 | 204,477 | Lake Erie..... | 822,318 | 509,142 |
| Ann Arbor, Michigan..... | 9,431 | 8,061 | Adrian, Michigan..... | 8,756 | 7,849 |
| Alpena, Michigan..... | 11,283 | 6,153 | Akron, Ohio..... | 27,601 | 16,512 |
| Bay city, Michigan..... | 27,839 | 20,693 | Ashtabula, Ohio..... | 8,338 | 4,445 |
| Detroit, Michigan..... | 205,876 | 116,340 | Buffalo, New York..... | 255,664 | 155,134 |
| Flint, Michigan..... | 9,803 | 8,469 | Cleveland, Ohio..... | 261,353 | 160,146 |
| Port Huron, Michigan..... | 13,543 | 8,883 | Dunkirk, New York..... | 9,416 | 7,248 |
| Saginaw, Michigan..... | 46,322 | 29,541 | Erie, Pennsylvania..... | 40,634 | 27,737 |
| West Bay city, Michigan..... | 12,981 | 6,397 | Findlay, Ohio..... | 18,553 | 4,033 |
| Lake Michigan..... | 1,622,462 | 799,945 | Jamestown (Lake Chautauqua), New York..... | 16,038 | 9,357 |
| Appleton, Wisconsin..... | 11,869 | 8,005 | Mansfield, Ohio..... | 13,473 | 9,859 |
| Aurora, Illinois..... | 19,688 | 11,873 | Meadville, Pennsylvania..... | 9,520 | 8,860 |
| Chicago, Illinois..... | 1,099,850 | 503,185 | Sandusky, Ohio..... | 18,471 | 15,838 |
| Elgin, Illinois..... | 17,823 | 8,787 | Titusville, Pennsylvania..... | 9,046 | 8,073 |
| Fond du Lac (Lake Winnebago), Wisconsin..... | 12,024 | 13,094 | Toledo, Ohio..... | 81,434 | 50,137 |
| Green Bay, Wisconsin..... | 9,069 | 7,464 | Tiffin, Ohio..... | 10,801 | 7,879 |
| Grand Rapids, Michigan..... | 60,278 | 32,016 | Youngstown, Ohio..... | 33,220 | 15,435 |
| Joliet, Illinois..... | 23,264 | 11,657 | Lake Ontario and St. Lawrence river..... | 327,155 | 230,952 |
| Iron Mountain, Michigan..... | 8,599 | ..... | Auburn, New York..... | 25,858 | 21,024 |
| Kankakee, Illinois..... | 9,025 | 5,651 | Lockport, New York..... | 16,038 | 13,522 |
| Kalamazoo, Michigan..... | 17,853 | 11,937 | Ogdensburg, New York..... | 11,662 | 10,341 |
| Manistee, Michigan..... | 12,812 | 6,930 | Oswego, New York..... | 21,842 | 21,116 |
| Marinette, Wisconsin..... | 11,523 | 2,750 | Rome, New York..... | 14,991 | 12,194 |
| Menominee, Michigan..... | 10,630 | 3,288 | Rochester, New York..... | 132,896 | 89,366 |
| Michigan, Indiana..... | 10,776 | 7,366 | Syracuse, New York..... | 88,143 | 51,792 |
| Milwaukee, Wisconsin..... | 204,468 | 115,587 | Watertown, New York..... | 14,725 | 10,697 |

Remarkable as has been the increase of this urban population, generally considered, the reader can not fail to note the extraordinary fact that 3 of these large cities, Ashland, Superior, and Iron Mountain, have sprung into existence during the decade 1880-1890, while Duluth's growth has been from so small a beginning to so large a result that it can almost be considered in the same category. This practical creation of 4 populous cities is mainly if not entirely due to the development in the production of iron ore in the Lake Superior and Lake Michigan districts. In this connection the figures in the following paragraph, which have been compiled from official returns, are at once pertinent and instructive.

In 1889 there were 592 iron-ore producing mines in the United States which reported to the bureau of statistics, of which 89 were in the Lake Superior district. The product of the 592 mines was 14,518,041 long tons of ore, which, at an average value of \$2.30 per ton, means a total value of \$33,351,978. The product of the Lake Superior district amounted to 6,693,568 tons, valued at \$16,641,429. The port of Escanaba does not appear in the preceding list of cities having a population of over 8,000, but it undoubtedly belongs to the list of those cities whose growth is due almost entirely to lake traffic in iron ore. From this port 3,364,067 tons of iron ore were shipped in 1889 and 4,171,210 tons in 1890. During the same year Bilbao, in Spain, shipped 4,272,918 tons, but as Bilbao is an open port for the whole year, its shipments were at the rate of 356,077 tons per month, while the lake port, being open but 10 months in the year, shipped at the rate of 417,121 tons per month, making Escanaba, therefore, the greatest ore port in the world.

LAKE LANDINGS AND DISTANCES.

As in the case of the report on the rivers of the Mississippi valley, this text can not be brought to a better conclusion than by giving a list of the principal trading points on the Great Lakes and St. Lawrence river, with the distances from port to port:

LAKE AND RIVER LANDINGS BETWEEN OGDENSBURG AND DULUTH (DISTANCES FROM OGDENSBURG).

| | MILES. | | MILES. | | MILES. |
|---|--------|--------------------------------------|--------|--|--------|
| Cape Vincent, Lake Ontario..... | 68 | Sand Beach, Lake Huron..... | 615 | Marquette, Lake Superior..... | 997 |
| Kingston, Lake Ontario (Canada)... | 69 | Goderich, Lake Huron (Canada).... | 616 | Green Bay, Lake Michigan..... | 1,002 |
| Oswego, Lake Ontario..... | 115 | Oscoda, Lake Huron..... | 666 | Sheboygan, Lake Michigan..... | 1,017 |
| Fair Haven, Lake Ontario..... | 134 | Tawas, Lake Huron..... | 672 | Copper Harbor, Lake Superior..... | 1,027 |
| Charlotte, Lake Ontario..... | 158 | Saginaw river, Lake Huron..... | 700 | Muskegon, Lake Michigan..... | 1,043 |
| Toronto, Lake Ontario (Canada).... | 222 | Alpena, Lake Huron..... | 709 | Grand Haven, Lake Michigan..... | 1,045 |
| Port Dalhousie, Lake Ontario (Canada)..... | 330 | Cheboygan, Lake Huron..... | 787 | L'Anse, Lake Superior..... | 1,054 |
| Port Colborne, Lake Erie (Canada)... | 256 | Mackinac, Lake Huron..... | 794 | Houghton, Lake Superior..... | 1,058 |
| Buffalo, Lake Erie..... | 276 | Owen sound, Lake Huron (Canada)... | 800 | Milwaukee, Lake Michigan..... | 1,062 |
| Erie, Lake Erie..... | 321 | Collingwood, Lake Huron (Canada)... | 818 | St. Joseph, Lake Michigan..... | 1,102 |
| Ashtabula, Lake Erie..... | 358 | Midland, Lake Huron (Canada)..... | 827 | Ontonagon, Lake Superior..... | 1,109 |
| Cleveland, Lake Erie..... | 412 | Sault Ste. Marie, Lake Superior..... | 838 | Chicago, Lake Michigan..... | 1,132 |
| Sandusky, Lake Erie..... | 458 | Traverse, Lake Michigan..... | 897 | Port Arthur, Lake Superior (Canada)... | 1,108 |
| Toledo, Lake Erie..... | 491 | Escanaba, Lake Michigan..... | 935 | Bayfield, Lake Superior..... | 1,173 |
| Detroit, Detroit river (Lake St. Clair)... | 493 | Manistee, Lake Michigan..... | 950 | Ashland, Lake Superior..... | 1,186 |
| Port Huron, St. Clair river (Lake Huron)..... | 553 | Ludington, Lake Michigan..... | 978 | Duluth, Lake Superior..... | 1,235 |
| | | Manitowoc, Lake Michigan..... | 993 | | |

LAKE AND RIVER LANDINGS BETWEEN BUFFALO AND OGDENSBURG (DISTANCES FROM BUFFALO).

| | | | | | |
|--|----|-------------------------------|-----|-------------------------------------|-----|
| Port Colborne, Lake Erie (Canada)... | 20 | Charlotte, Lake Ontario..... | 127 | Kingston, Lake Ontario (Canada)... | 207 |
| Toronto, Lake Ontario (Canada).... | 77 | Fair Haven, Lake Ontario..... | 180 | Cape Vincent, Lake Ontario..... | 208 |
| Port Dalhousie, Lake Ontario (Canada)..... | 97 | Oswego, Lake Ontario..... | 190 | Ogdensburg, St. Lawrence river..... | 276 |

LAKE AND RIVER LANDINGS BETWEEN BUFFALO AND DULUTH (DISTANCES FROM BUFFALO).

| | | | | | |
|---|-----|--------------------------------------|-----|--|-----|
| Erie, Lake Erie..... | 80 | Alpena, Lake Huron..... | 471 | Sheboygan, Lake Michigan..... | 779 |
| Ashtabula, Lake Erie..... | 116 | Cheboygan, Lake Huron..... | 549 | Copper Harbor, Lake Superior..... | 789 |
| Cleveland, Lake Erie..... | 174 | Mackinac, Lake Huron..... | 556 | Muskegon, Lake Michigan..... | 805 |
| Put in Bay, Lake Erie..... | 215 | Owen sound, Lake Huron (Canada)... | 562 | Grand Haven, Lake Michigan..... | 807 |
| Sundusky, Lake Erie..... | 217 | Collingwood, Lake Huron (Canada)... | 580 | L'Anse, Lake Superior..... | 816 |
| Toledo, Lake Erie..... | 252 | Midland, Lake Huron (Canada)..... | 589 | Houghton, Lake Superior..... | 820 |
| Detroit, Detroit river (Lake St. Clair)... | 255 | Sault Ste. Marie, Lake Superior..... | 600 | Milwaukee, Lake Michigan..... | 824 |
| Port Huron, St. Clair river (Lake Huron)..... | 315 | Traverse, Lake Michigan..... | 658 | St. Joseph, Lake Michigan..... | 864 |
| Sand Beach, Lake Huron..... | 377 | Escanaba, Lake Michigan..... | 697 | Port Arthur, Lake Superior (Canada)... | 870 |
| Goderich, Lake Huron (Canada)..... | 378 | Manistee, Lake Michigan..... | 712 | Ontonagon, Lake Superior..... | 871 |
| Oscoda, Lake Huron..... | 428 | Ludington, Lake Michigan..... | 739 | Chicago, Lake Michigan..... | 889 |
| Tawas, Lake Huron..... | 434 | Manitowoc, Lake Michigan..... | 755 | Bayfield, Lake Superior..... | 935 |
| Saginaw river, Lake Huron..... | 463 | Marquette, Lake Superior..... | 759 | Ashland, Lake Superior..... | 948 |
| | | Green Bay, Lake Michigan..... | 764 | Duluth, Lake Superior..... | 997 |

LAKE AND RIVER LANDINGS BETWEEN CLEVELAND AND OGDENSBURG (DISTANCES FROM CLEVELAND).

| | | | | | |
|--------------------------------------|-----|--|-----|-------------------------------------|-----|
| Ashtabula, Lake Erie..... | 56 | Port Dalhousie, Lake Ontario (Canada)... | 193 | Oswego, Lake Ontario..... | 326 |
| Erie, Lake Erie..... | 99 | Toronto, Lake Ontario (Canada)..... | 212 | Kingston, Lake Ontario (Canada)... | 343 |
| Port Colborne, Lake Erie (Canada)... | 156 | Charlotte, Lake Ontario..... | 273 | Cape Vincent, Lake Ontario..... | 344 |
| Buffalo, Lake Erie..... | 174 | Fair Haven, Lake Ontario..... | 316 | Ogdensburg, St. Lawrence river..... | 412 |

LAKE AND RIVER LANDINGS BETWEEN CLEVELAND AND DULUTH (DISTANCES FROM CLEVELAND).

| | MILES. | | MILES. | | MILES. |
|--|--------|---------------------------------------|--------|-------------------------------------|--------|
| Sandusky, Lake Erie | 56 | Mackinac, Lake Huron | 406 | Copper Harbor, Lake Superior | 639 |
| Put in Bay, Lake Erie | 64 | Owen sound, Lake Huron (Canada) .. | 412 | Muskegon, Lake Michigan | 655 |
| Toledo, Lake Erie | 100 | Collingwood, Lake Huron (Canada) .. | 430 | Grand Haven, Lake Michigan | 657 |
| Detroit, Detroit river (Lake St. Clair) | 105 | Midland, Lake Huron (Canada) | 439 | L'Anse, Lake Superior | 666 |
| Port Huron, St. Clair river (Lake Huron) | 165 | Sault Ste. Marie, Lake Superior | 450 | Houghton, Lake Superior | 670 |
| Sand Beach, Lake Huron | 227 | Traverse, Lake Michigan | 509 | Milwaukee, Lake Michigan | 674 |
| Goderich, Lake Huron (Canada) | 228 | Escanaba, Lake Michigan | 547 | St. Joseph, Lake Michigan | 714 |
| Oscoda, Lake Huron | 278 | Manistee, Lake Michigan | 562 | Port Arthur, Lake Superior (Canada) | 720 |
| Tawas, Lake Huron | 284 | Ludington, Lake Michigan | 590 | Ontonagon, Lake Superior | 721 |
| Saginaw river, Lake Huron | 312 | Manitowoc, Lake Michigan | 605 | Chicago, Lake Michigan | 739 |
| Alpena, Lake Huron | 321 | Marquette, Lake Superior | 609 | Bayfield, Lake Superior | 785 |
| Cheboygan, Lake Huron | 399 | Green Bay, Lake Michigan | 614 | Ashland, Lake Superior | 798 |
| | | Sheboygan, Lake Michigan | 629 | Duluth, Lake Superior | 847 |

LAKE AND RIVER LANDINGS BETWEEN DETROIT AND OGDENSBURG (DISTANCES FROM DETROIT).

| | | | | | |
|-----------------------------|-----|---------------------------------------|-----|--------------------------------------|-----|
| Put in Bay, Lake Erie | 50 | Port Colborne, Lake Erie (Canada) .. | 237 | Fair Haven, Lake Ontario | 397 |
| Toledo, Lake Erie | 57 | Buffalo, Lake Erie | 255 | Oswego, Lake Ontario | 407 |
| Sandusky, Lake Erie | 68 | Port Dalhousie, Lake Ontario (Canada) | 264 | Kingston, Lake Ontario (Canada) .. | 424 |
| Cleveland, Lake Erie | 105 | Toronto, Lake Ontario (Canada) | 294 | Cape Vincent, Lake Ontario | 425 |
| Ashtabula, Lake Erie | 147 | Charlotte, Lake Ontario | 354 | Ogdensburg, St. Lawrence river | 493 |
| Erie, Lake Erie | 185 | | | | |

LAKE AND RIVER LANDINGS BETWEEN DETROIT AND DULUTH (DISTANCES FROM DETROIT).

| | | | | | |
|--|-----|---------------------------------------|-----|-------------------------------------|-----|
| Port Huron, St. Clair river (Lake Huron) | 60 | Midland, Lake Huron (Canada) | 334 | Grand Haven, Lake Michigan | 552 |
| Sand Beach, Lake Huron | 122 | Sault Ste. Marie, Lake Superior | 345 | L'Anse, Lake Superior | 561 |
| Goderich, Lake Huron (Canada) | 123 | Traverse, Lake Michigan | 404 | Houghton, Lake Superior | 565 |
| Oscoda, Lake Huron | 173 | Escanaba, Lake Michigan | 442 | Milwaukee, Lake Michigan | 569 |
| Tawas, Lake Huron | 179 | Manistee, Lake Michigan | 457 | St. Joseph, Lake Michigan | 609 |
| Saginaw river, Lake Huron | 207 | Ludington, Lake Michigan | 485 | Port Arthur, Lake Superior (Canada) | 615 |
| Alpena, Lake Huron | 216 | Manitowoc, Lake Michigan | 500 | Ontonagon, Lake Superior | 616 |
| Cheboygan, Lake Huron | 294 | Marquette, Lake Superior | 504 | Chicago, Lake Michigan | 634 |
| Mackinac, Lake Huron | 303 | Green Bay, Lake Michigan | 509 | Bayfield, Lake Superior | 680 |
| Owen sound, Lake Huron (Canada) .. | 307 | Sheboygan, Lake Michigan | 524 | Ashland, Lake Superior | 693 |
| Collingwood, Lake Huron (Canada) .. | 325 | Copper Harbor, Lake Superior | 534 | Duluth, Lake Superior | 742 |
| | | Muskegon, Lake Michigan | 550 | | |

LAKE AND RIVER LANDINGS BETWEEN CHEBOYGAN AND OGDENSBURG (DISTANCES FROM CHEBOYGAN).

| | | | | | |
|--|-----|---|-----|---|-----|
| Alpena, Lake Huron | 100 | Midland, Lake Huron (Canada) | 239 | Port Dalhousie, Lake Ontario (Canada) | 558 |
| Oscoda, Lake Huron | 126 | Detroit, Detroit river (Lake St. Clair) | 294 | Toronto, Lake Ontario (Canada) | 588 |
| Tawas, Lake Huron | 145 | Put in Bay, Lake Erie | 344 | Charlotte, Lake Ontario | 648 |
| Sand Beach, Lake Huron | 173 | Toledo, Lake Erie | 351 | Fair Haven, Lake Ontario | 691 |
| Saginaw river, Lake Huron | 190 | Sandusky, Lake Erie | 362 | Oswego, Lake Ontario | 701 |
| Goderich, Lake Huron (Canada) | 200 | Cleveland, Lake Erie | 399 | Kingston, Lake Ontario (Canada) | 718 |
| Owen sound, Lake Huron (Canada) .. | 212 | Ashtabula, Lake Erie | 441 | Cape Vincent, Lake Ontario | 719 |
| Collingwood, Lake Huron (Canada) .. | 230 | Erie, Lake Erie | 479 | Ogdensburg, St. Lawrence river | 784 |
| Port Huron, St. Clair river (Lake Huron) | 234 | Port Colborne, Lake Erie (Canada) .. | 539 | | |
| | | Buffalo, Lake Erie | 549 | | |

LAKE AND RIVER LANDINGS BETWEEN CHEBOYGAN AND DULUTH (DISTANCES FROM CHEBOYGAN).

| | | | | | |
|---------------------------------------|-----|------------------------------------|-----|-------------------------------------|-----|
| Mackinac, Lake Huron | 17 | Sheboygan, Lake Michigan | 232 | St. Joseph, Lake Michigan | 317 |
| Sault Ste. Marie, Lake Superior | 93 | Marquette, Lake Superior | 252 | Chicago, Lake Michigan | 342 |
| Traverse, Lake Michigan | 112 | Muskegon, Lake Michigan | 258 | Port Arthur, Lake Superior (Canada) | 363 |
| Escanaba, Lake Michigan | 150 | Grand Haven, Lake Michigan | 260 | Ontonagon, Lake Superior | 364 |
| Manistee, Lake Michigan | 165 | Milwaukee, Lake Michigan | 277 | Bayfield, Lake Superior | 428 |
| Ludington, Lake Michigan | 193 | Copper Harbor, Lake Superior | 282 | Ashland, Lake Superior | 441 |
| Manitowoc, Lake Michigan | 208 | L'Anse, Lake Superior | 309 | Duluth, Lake Superior | 490 |
| Green Bay, Lake Michigan | 217 | Houghton, Lake Superior | 313 | | |

STATISTICS OF TRANSPORTATION.

LAKE AND RIVER LANDINGS BETWEEN GRAND HAVEN AND OGDENSBURG (DISTANCES FROM GRAND HAVEN).

| | MILES. | | MILES. | | MILES. |
|-------------------------------|--------|--|--------|---------------------------------------|--------|
| Muskegon, Lake Michigan..... | 20 | Saginaw river, Lake Huron | 448 | Ashtabula, Lake Erie | 699 |
| Ludington, Lake Michigan..... | 68 | Goderich, Lake Huron (Canada)..... | 458 | Erie, Lake Erie | 737 |
| Manistee, Lake Michigan..... | 93 | Owen sound, Lake Huron (Canada) .. | 469 | Port Colborne, Lake Erie (Canada) .. | 789 |
| Green Bay, Lake Michigan..... | 184 | Collingwood, Lake Huron (Canada) .. | 487 | Buffalo, Lake Erie | 807 |
| Escanaba, Lake Michigan..... | 193 | Port Huron, St. Clair river (Lake Huron) | 492 | Port Dalhousie, Lake Ontario (Canada) | 816 |
| Traverse, Lake Michigan..... | 210 | Midland, Lake Huron (Canada) | 496 | Toronto, Lake Ontario (Canada) | 846 |
| Mackinac, Lake Huron..... | 246 | Detroit, Detroit river (Lake St. Clair) | 552 | Charlotte, Lake Ontario..... | 906 |
| Sheboygan, Lake Michigan..... | 260 | Put in Bay, Lake Erie | 602 | Fair Haven, Lake Ontario..... | 949 |
| Alpena, Lake Huron | 358 | Toledo, Lake Erie..... | 609 | Oswego, Lake Ontario..... | 959 |
| Oscoda, Lake Huron | 384 | Sandusky, Lake Erie..... | 620 | Kingston, Lake Ontario (Canada) ... | 976 |
| Tawas, Lake Huron | 403 | Cleveland, Lake Erie..... | 657 | Cape Vincent, Lake Ontario..... | 977 |
| Sand Beach, Lake Huron..... | 431 | | | Ogdensburg, St. Lawrence river..... | 1,045 |

LAKE AND RIVER LANDINGS BETWEEN GRAND HAVEN AND DULUTH (DISTANCES FROM GRAND HAVEN).

| | | | | | |
|---------------------------------|-----|---------------------------------------|-----|-------------------------------------|-----|
| St. Joseph, Lake Michigan | 68 | Sault Ste. Marie, Lake Superior | 339 | Port Arthur, Lake Superior (Canada) | 609 |
| Milwaukee, Lake Michigan..... | 85 | Marquette, Lake Superior..... | 498 | Ontonagon, Lake Superior..... | 610 |
| Sheboygan, Lake Michigan..... | 88 | Copper Harbor, Lake Superior | 528 | Bayfield, Lake Superior | 674 |
| Manitowoc, Lake Michigan..... | 103 | L'Anse, Lake Superior | 555 | Ashland, Lake Superior | 687 |
| Chicago, Lake Michigan | 109 | Houghton, Lake Superior | 559 | Duluth, Lake Superior | 736 |

LAKE AND RIVER LANDINGS BETWEEN CHICAGO AND OGDENSBURG (DISTANCES FROM CHICAGO).

| | | | | | |
|----------------------------------|------|--|-----|---------------------------------------|-------|
| St. Joseph, Lake Michigan..... | 61 | Oscoda, Lake Huron | 466 | Cleveland, Lake Erie..... | 739 |
| Milwaukee, Lake Michigan..... | 84 | Tawas, Lake Huron..... | 485 | Ashtabula, Lake Erie | 781 |
| Grand Haven, Lake Michigan | 109 | Sand Beach, Lake Huron | 513 | Erie, Lake Erie | 819 |
| Muskegon, Lake Michigan..... | 120 | Saginaw river, Lake Huron..... | 530 | Port Colborne, Lake Erie (Canada) .. | 871 |
| Sheboygan, Lake Michigan | 128 | Goderich, Lake Huron (Canada)..... | 540 | Buffalo, Lake Erie | 889 |
| Manitowoc, Lake Michigan | 156 | Owen sound, Lake Huron (Canada) .. | 552 | Port Dalhousie, Lake Ontario (Canada) | 898 |
| Ludington, Lake Michigan | 157 | Collingwood, Lake Huron (Canada) .. | 570 | Toronto, Lake Ontario (Canada)..... | 928 |
| Manistee, Lake Michigan..... | 182 | Port Huron, St. Clair river (Lake Huron) | 574 | Charlotte, Lake Ontario..... | 988 |
| Green Bay, Lake Michigan | a255 | Midland, Lake Huron (Canada) | 579 | Fair Haven, Lake Ontario..... | 1,031 |
| Escanaba, Lake Michigan..... | 280 | Detroit, Detroit river (Lake St. Clair) | 634 | Oswego, Lake Ontario | 1,041 |
| Traverse, Lake Michigan | 298 | Put in Bay, Lake Erie..... | 684 | Kingston, Lake Ontario (Canada) ... | 1,058 |
| Mackinac, Lake Huron..... | 329 | Toledo, Lake Erie | 691 | Cape Vincent, Lake Ontario | 1,059 |
| Cheboygan, Lake Huron | 342 | Sandusky, Lake Erie | 702 | Ogdensburg, St. Lawrence river | 1,127 |
| Alpena, Lake Huron | 440 | | | | |

LAKE AND RIVER LANDINGS BETWEEN CHICAGO AND DULUTH (DISTANCES FROM CHICAGO).

| | | | | | |
|--------------------------------------|-----|-------------------------------------|-----|------------------------------|------|
| Sault Ste. Marie, Lake Superior..... | 422 | Houghton, Lake Superior..... | 642 | Bayfield, Lake Superior..... | b757 |
| Marquette, Lake Superior..... | 581 | Port Arthur, Lake Superior (Canada) | 692 | Ashland, Lake Superior..... | b770 |
| Copper Harbor, Lake Superior | 611 | Ontonagon, Lake Superior | 693 | Duluth, Lake Superior..... | 819 |
| L'Anse, Lake Superior..... | 638 | | | | |

LAKE AND RIVER LANDINGS BETWEEN MILWAUKEE AND OGDENSBURG (DISTANCES FROM MILWAUKEE).

| | | | | | |
|---------------------------------|------|--|-----|---------------------------------------|-------|
| Sheboygan, Lake Michigan..... | 52 | Tawas, Lake Huron..... | 420 | Cleveland, Lake Erie..... | 674 |
| Manitowoc, Lake Michigan..... | 77 | Sand Beach, Lake Huron..... | 448 | Ashtabula, Lake Erie..... | 716 |
| Grand Haven, Lake Michigan..... | 85 | Saginaw river, Lake Huron | 465 | Erie, Lake Erie..... | 754 |
| Muskegon, Lake Michigan..... | 85 | Goderich, Lake Huron (Canada)..... | 475 | Port Colborne, Lake Erie (Canada) .. | 806 |
| St. Joseph, Lake Michigan..... | 97 | Owen sound, Lake Huron (Canada) .. | 489 | Buffalo, Lake Erie..... | 824 |
| Ludington, Lake Michigan..... | 98 | Collingwood, Lake Huron (Canada) .. | 507 | Port Dalhousie, Lake Ontario (Canada) | 833 |
| Manistee, Lake Michigan..... | 117 | Port Huron, St. Clair river (Lake Huron) | 509 | Toronto, Lake Ontario (Canada)..... | 863 |
| Green Bay, Lake Michigan | a178 | Midland, Lake Huron (Canada)..... | 516 | Charlotte, Lake Ontario..... | 923 |
| Escanaba, Lake Michigan..... | 202 | Detroit, Detroit river (Lake St. Clair) | 569 | Fair Haven, Lake Ontario..... | 966 |
| Traverse, Lake Michigan..... | 222 | Put in Bay, Lake Erie | 619 | Oswego, Lake Ontario..... | 976 |
| Mackinac, Lake Huron..... | 266 | Toledo, Lake Erie..... | 626 | Kingston, Lake Ontario (Canada) ... | 993 |
| Cheboygan, Lake Huron..... | 277 | Sandusky, Lake Erie..... | 637 | Cape Vincent, Lake Ontario..... | 994 |
| Alpena, Lake Huron | 375 | | | Ogdensburg, St. Lawrence river | 1,062 |
| Oscoda, Lake Huron | 401 | | | | |

LAKE AND RIVER LANDINGS BETWEEN MILWAUKEE AND DULUTH (DISTANCES FROM MILWAUKEE).

| | | | | | |
|--------------------------------------|-----|-------------------------------------|-----|------------------------------|-----|
| Chicago, Lake Michigan..... | 84 | L'Anse, Lake Superior..... | 575 | Bayfield, Lake Superior..... | 694 |
| Sault Ste. Marie, Lake Superior..... | 359 | Houghton, Lake Superior..... | 579 | Ashland, Lake Superior | 707 |
| Marquette, Lake Superior..... | 518 | Port Arthur, Lake Superior (Canada) | 629 | Duluth, Lake Superior..... | 756 |
| Copper Harbor, Lake Superior..... | 548 | Ontonagon, Lake Superior | 630 | | |

a Through Sturgeon Bay canal.

b Through Portage canal.

LAKE AND RIVER LANDINGS BETWEEN MARQUETTE AND OGDENSBURG (DISTANCES FROM MARQUETTE).

| | MILES. | | MILES. | | MILES. |
|--------------------------------------|--------|---|--------|---------------------------------------|--------|
| Sault Ste. Marie, Lake Superior..... | 159 | Collingwood, Lake Huron (Canada) . | 427 | Chicago, Lake Michigan..... | 581 |
| Cheboygan, Lake Huron..... | 252 | Midland, Lake Huron (Canada)..... | 436 | Cleveland, Lake Erie..... | 609 |
| Mackinac, Lake Huron..... | 259 | Port Huron, St. Clair river (Lake | | Ashtabula, Lake Erie..... | 651 |
| Alpena, Lake Huron..... | 309 | Huron)..... | 444 | Erie, Lake Erie..... | 689 |
| Oscoda, Lake Huron..... | 336 | Manitowoc, Lake Michigan..... | 448 | Port Colborne, Lake Erie (Canada).. | 741 |
| Traverse Lake Michigan..... | 352 | Green Bay, Lake Michigan..... | 453 | Buffalo, Lake Erie..... | 759 |
| Tawas, Lake Huron..... | 359 | Sheboygan, Lake Michigan..... | 468 | Port Dalhousie, Lake Ontario (Canada) | 768 |
| Sand Beach, Lake Huron..... | 386 | Grand Haven, Lake Michigan..... | 498 | Toronto, Lake Ontario (Canada).... | 798 |
| Escanaba, Lake Michigan..... | 392 | Detroit, Detroit river (Lake St. Clair) | 504 | Charlotte, Lake Ontario..... | 858 |
| Saginaw river, Lake Huron..... | 395 | Milwaukee, Lake Michigan..... | 518 | Fair Haven, Lake Ontario..... | 901 |
| Manistee, Lake Michigan..... | 402 | Put in Bay, Lake Erie..... | 554 | Oswego, Lake Ontario..... | 911 |
| Muskegon, Lake Michigan..... | 405 | St. Joseph, Lake Michigan..... | 556 | Kingston, Lake Ontario (Canada)... | 928 |
| Owen sound, Lake Huron (Canada)... | 409 | Toledo, Lake Erie..... | 561 | Cape Vincent, Lake Ontario..... | 929 |
| Goderich, Lake Huron (Canada).... | 412 | Sandusky, Lake Erie..... | 572 | Ogdensburg, St. Lawrence river..... | 997 |
| Ludington, Lake Michigan..... | 427 | | | | |

LAKE AND RIVER LANDINGS BETWEEN MARQUETTE AND DULUTH (DISTANCES FROM MARQUETTE).

| | | | | | |
|-----------------------------------|-----|-------------------------------------|------|-----------------------------|------|
| Copper Harbor, Lake Superior..... | 78 | Ontonagon, Lake Superior..... | 141 | Ashland, Lake Superior..... | a219 |
| L'Anse, Lake Superior..... | 79 | Port Arthur, Lake Superior (Canada) | 172 | Duluth, Lake Superior..... | a266 |
| Houghton, Lake Superior..... | a82 | Bayfield, Lake Superior..... | a207 | | |

LAKE AND RIVER LANDINGS BETWEEN DULUTH AND OGDENSBURG (DISTANCES FROM DULUTH).

| | | | | | |
|--------------------------------------|------|---|-----|---------------------------------------|-------|
| Bayfield, Lake Superior..... | 80 | Manistee, Lake Michigan..... | 640 | Toledo, Lake Erie..... | 799 |
| Ashland, Lake Superior..... | 94 | Muskegon, Lake Michigan..... | 643 | Sandusky, Lake Erie..... | 810 |
| Ontonagon, Lake Superior..... | 138 | Owen sound, Lake Huron (Canada) .. | 647 | Chicago, Lake Michigan..... | 819 |
| Houghton, Lake Superior..... | a178 | Goderich, Lake Huron (Canada)..... | 650 | Cleveland, Lake Erie..... | 847 |
| Copper Harbor, Lake Superior..... | 206 | Collingwood, Lake Huron (Canada) . | 655 | Ashtabula, Lake Erie..... | 889 |
| L'Anse, Lake Superior..... | a209 | Ludington, Lake Michigan..... | 665 | Erie, Lake Erie..... | 927 |
| Marquette, Lake Superior..... | a266 | Midland, Lake Huron (Canada)..... | 674 | Port Colborne, Lake Erie (Canada).. | 979 |
| Sault Ste. Marie, Lake Superior..... | 397 | Port Huron, St. Clair river (Lake | | Buffalo, Lake Erie..... | 997 |
| Cheboygan, Lake Huron..... | 490 | Huron)..... | 682 | Port Dalhousie, Lake Ontario (Canada) | 1,006 |
| Mackinac, Lake Huron..... | 497 | Manitowoc, Lake Michigan..... | 686 | Toronto, Lake Ontario (Canada).... | 1,036 |
| Alpena, Lake Huron..... | 547 | Green Bay, Lake Michigan..... | 691 | Charlotte, Lake Ontario..... | 1,096 |
| Oscoda, Lake Huron..... | 574 | Sheboygan, Lake Michigan..... | 706 | Fair Haven, Lake Ontario..... | 1,139 |
| Traverse, Lake Michigan..... | 590 | Grand Haven, Lake Michigan..... | 736 | Oswego, Lake Ontario..... | 1,149 |
| Tawas, Lake Huron..... | 597 | Detroit, Detroit river (Lake St. Clair) | 742 | Kingston, Lake Ontario (Canada).... | 1,166 |
| Sand Beach, Lake Huron..... | 624 | Milwaukee, Lake Michigan..... | 756 | Cape Vincent, Lake Ontario..... | 1,167 |
| Escanaba, Lake Michigan..... | 630 | Put in Bay, Lake Erie..... | 792 | Ogdensburg, St. Lawrence river..... | 1,235 |
| Saginaw river, Lake Huron..... | 633 | St. Joseph, Lake Michigan..... | 794 | | |

a Through Portage canal.

STATISTICAL TABLES.

EQUIPMENT, OCCUPATION, AND CONSTRUCTION.

TABLE 1.—EQUIPMENT OF FLEETS IN GENERAL—NUMBER, TONNAGE, AND VALUE OF ALL STEAMERS, SAILING VESSELS, AND UNRIGGED CRAFT FORMING THE LAKE FLEETS AND CREDITED TO THE RESPECTIVE PORTS OF HAIL, WITH TOTALS FOR EACH LAKE AND ST. LAWRENCE RIVER.

| PORTS. | TOTAL OF ALL CRAFT. | | | STEAMERS. | | | SAILING VESSELS. | | | UNRIGGED CRAFT. | | |
|--------------------------------|---------------------|-------------------|--------------|--------------|-------------------|--------------|------------------|-------------------|-------------|-----------------|-------------------|-----------------|
| | Num- ber. | Gross tonnage. | Valuation. | Num- ber. | Gross tonnage. | Valuation. | Num- ber. | Gross tonnage. | Valuation. | Num- ber. | Gross tonnage. | Valua- tion. |
| Total..... | 2,737 | 920,294 | \$48,580,174 | 1,467 | 595,813 | \$40,868,824 | 962 | 185,081 | \$4,238,850 | 308 | 139,400 | \$3,472,500 |
| Lake Superior..... | 167 | 39,653 | 2,763,500 | 126 | 20,257 | 2,344,300 | 31 | 2,784 | 74,200 | 10 | 7,612 | 345,000 |
| Ashland, Wisconsin..... | 1 | 73 | 5,000 | 1 | 73 | 5,000 | | | | | | |
| Baraga, Michigan..... | 3 | 1,319 | 44,000 | 1 | 35 | 6,000 | | | | 2 | 1,284 | 38,000 |
| Bayfield, Wisconsin..... | 1 | 291 | 6,000 | | | | 1 | 291 | 6,000 | | | |
| Duluth, Minnesota..... | 39 | 4,386 | 338,300 | 35 | 1,614 | 161,800 | 1 | 88 | 1,500 | 3 | 2,684 | 175,000 |
| Marquette, Michigan..... | 111 | 20,759 | 1,532,200 | 81 | 18,028 | 1,461,500 | 29 | 2,405 | 66,700 | 1 | 326 | 4,000 |
| Pequaming, Michigan..... | 4 | 2,082 | 124,000 | 2 | 1,069 | 79,000 | | | | 2 | 1,013 | 45,000 |
| Republic, Michigan..... | 4 | 5,314 | 239,000 | 2 | 3,009 | 156,000 | | | | 2 | 2,305 | 83,000 |
| St. Marys Falls, Michigan..... | 2 | 477 | 25,000 | 2 | 477 | 25,000 | | | | | | |
| Superior, Wisconsin..... | 2 | 4,952 | 450,000 | 2 | 4,952 | 450,000 | | | | | | |
| Lakes Huron and St. Clair..... | 726 | 262,833 | 13,107,650 | 340 | 152,463 | 10,521,600 | 213 | 34,119 | 812,050 | 173 | 76,251 | 1,774,000 |
| Algona, Michigan..... | 6 | 2,345 | 46,000 | | | | | | | 6 | 2,345 | 46,000 |
| Alpena, Michigan..... | 9 | 4,984 | 166,400 | 1 | 1,117 | 100,000 | | | | 8 | 3,867 | 66,400 |
| Bay city, Michigan..... | 56 | 31,176 | 1,146,100 | 11 | 7,286 | 447,500 | 7 | 3,625 | 127,400 | 38 | 20,265 | 571,200 |
| Cassville, Michigan..... | 1 | 298 | 4,000 | | | | 1 | 298 | 4,000 | | | |
| Cheboygan, Michigan..... | 2 | 83 | 7,500 | 2 | 83 | 7,500 | | | | | | |
| Detroit, Michigan..... | 275 | 129,788 | 7,547,800 | 144 | 88,906 | 6,594,000 | 87 | 19,475 | 416,500 | 44 | 21,387 | 537,300 |
| East China, Michigan..... | 2 | 1,440 | 67,000 | | | | | | | 2 | 1,440 | 67,000 |
| East Saginaw, Michigan..... | 30 | 13,261 | 419,600 | 6 | 3,999 | 251,500 | 2 | 776 | 14,000 | 22 | 8,488 | 154,100 |
| Marine, Michigan..... | 23 | 9,875 | 230,800 | 1 | 1,110 | 50,000 | 5 | 2,038 | 40,500 | 17 | 6,718 | 140,300 |
| Mount Clemens, Michigan..... | 2 | 504 | 1,500 | | | | | | | 2 | 504 | 1,500 |
| New Baltimore, Michigan..... | 2 | 147 | 11,000 | 2 | 147 | 11,000 | | | | | | |
| Oscoda, Michigan..... | 3 | 1,289 | 17,000 | | | | 1 | 591 | 12,000 | 2 | 698 | 5,000 |
| Port Huron, Michigan..... | 293 | 61,482 | 3,253,950 | 165 | 48,042 | 2,953,100 | 106 | 6,381 | 184,150 | 22 | 7,059 | 116,700 |
| Saginaw, Michigan..... | 10 | 2,829 | 88,500 | 4 | 1,004 | 64,000 | 1 | 252 | 500 | 5 | 1,573 | 24,000 |
| St. Clair, Michigan..... | 12 | 3,343 | 100,500 | 4 | 760 | 43,000 | 3 | 683 | 13,000 | 5 | 1,900 | 44,500 |
| Lake Michigan..... | 1,003 | 196,216 | 9,114,400 | 453 | 101,800 | 7,227,600 | 500 | 76,577 | 1,485,300 | 50 | 17,839 | 401,500 |
| Benton Harbor, Michigan..... | 3 | 699 | 39,500 | 2 | 655 | 38,500 | 1 | 44 | 1,000 | | | |
| Charlevoix, Michigan..... | 6 | 488 | 12,800 | 2 | 83 | 7,000 | 4 | 405 | 5,800 | | | |
| Chicago, Illinois..... | 339 | 71,260 | 3,088,350 | 156 | 28,810 | 2,257,800 | 163 | 35,940 | 712,550 | 20 | 6,510 | 118,000 |
| Escanaba, Michigan..... | 5 | 1,615 | 52,000 | 1 | 448 | 25,000 | 4 | 1,167 | 27,000 | | | |
| Fort Howard, Wisconsin..... | 2 | 222 | 5,500 | | | | 2 | 222 | 5,500 | | | |
| Frankfort, Michigan..... | 1 | 7 | 1,000 | 1 | 7 | 1,000 | | | | | | |
| Grand Haven, Michigan..... | 225 | 22,308 | 1,608,650 | 147 | 16,861 | 1,447,300 | 77 | 4,829 | 123,350 | 1 | 618 | 38,000 |
| Green Bay, Wisconsin..... | 10 | 3,300 | 115,000 | 4 | 995 | 59,000 | 3 | 955 | 27,500 | 3 | 1,350 | 28,500 |
| Holland, Michigan..... | 2 | 220 | 3,000 | | | | 2 | 220 | 3,000 | | | |
| Kenosha, Wisconsin..... | 19 | 7,878 | 358,900 | 6 | 4,037 | 304,000 | 12 | 3,145 | 52,900 | 1 | 196 | 2,000 |
| Kewaunee, Wisconsin..... | 1 | 100 | 3,000 | | | | 1 | 160 | 3,000 | | | |
| Ludington, Michigan..... | 4 | 752 | 12,000 | | | | 4 | 752 | 12,000 | | | |
| Manistee, Michigan..... | 11 | 2,732 | 54,000 | 1 | 530 | 25,000 | 9 | 1,890 | 25,000 | 1 | 312 | 4,000 |
| Manitowoc, Wisconsin..... | 15 | 1,775 | 34,600 | | | | 15 | 1,775 | 34,600 | | | |
| Menominee, Michigan..... | 1 | 277 | 2,500 | | | | | | | 1 | 277 | 2,500 |
| Milwaukee, Wisconsin..... | 259 | 61,694 | 3,205,000 | 123 | 46,405 | 2,908,500 | 130 | 13,043 | 247,500 | 6 | 2,246 | 49,000 |
| Montague, Michigan..... | 2 | 217 | 4,000 | | | | 2 | 217 | 4,000 | | | |
| Muskegon, Michigan..... | 17 | 3,088 | 63,100 | 2 | 504 | 24,000 | 15 | 2,584 | 39,100 | | | |
| Northport, Michigan..... | 1 | 63 | 7,000 | 1 | 63 | 7,000 | | | | | | |
| Onkama, Michigan..... | 1 | 146 | 3,500 | | | | | | | 1 | 146 | 3,500 |
| Pentwater, Michigan..... | 2 | 260 | 4,500 | | | | 2 | 260 | 4,500 | | | |
| Peshigo, Wisconsin..... | 3 | 1,704 | 52,500 | | | | | | | 3 | 1,704 | 52,500 |
| Potoskey, Michigan..... | 1 | 123 | 12,000 | 1 | 123 | 12,000 | | | | | | |
| Racine, Wisconsin..... | 26 | 6,932 | 145,400 | | | | 15 | 2,883 | 47,400 | 11 | 4,049 | 98,000 |
| St. James, Michigan..... | 1 | 81 | 1,500 | | | | 1 | 81 | 1,500 | | | |
| St. Joseph, Michigan..... | 2 | 164 | 1,000 | | | | 2 | 164 | 1,000 | | | |
| Saugatuck, Michigan..... | 3 | 647 | 33,500 | 3 | 647 | 33,500 | | | | | | |
| Sheboygan, Wisconsin..... | 25 | 4,115 | 79,900 | | | | 24 | 3,914 | 76,900 | 1 | 201 | 3,000 |
| South Haven, Michigan..... | 4 | 374 | 5,100 | | | | 4 | 374 | 5,100 | | | |
| Spring Lake, Michigan..... | 2 | 345 | 8,000 | | | | 2 | 345 | 8,000 | | | |
| Sturgeon Bay, Wisconsin..... | 2 | 550 | 5,000 | | | | 1 | 320 | 2,500 | 1 | 230 | 2,500 |
| Suttons Bay, Michigan..... | 1 | 232 | 3,000 | | | | 1 | 232 | 3,000 | | | |
| Traverse, Michigan..... | 1 | 336 | 20,000 | 1 | 336 | 20,000 | | | | | | |
| Troy, Wisconsin..... | 1 | 301 | 7,000 | | | | 1 | 301 | 7,000 | | | |
| Waukegan, Illinois..... | 2 | 1,296 | 58,000 | 2 | 1,296 | 58,000 | | | | | | |
| Waukesha, Wisconsin..... | 1 | 48 | 600 | | | | 1 | 48 | 600 | | | |
| Whitehall, Michigan..... | 2 | 307 | 4,000 | | | | 2 | 307 | 4,000 | | | |

TRANSPORTATION ON THE GREAT LAKES.

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EQUIPMENT, OCCUPATION, AND CONSTRUCTION—Continued.

TABLE 1.—EQUIPMENT OF FLEETS IN GENERAL, ETC.—Continued.

| PORTS. | TOTAL OF ALL CRAFT. | | | STEAMERS. | | | SAILING VESSELS. | | | UNRIGGED CRAFT. | | |
|----------------------------------|---------------------|-------------------|--------------|--------------|-------------------|--------------|------------------|-------------------|-------------|-----------------|-------------------|------------|
| | Num- ber. | Gross tonnage. | Valuation. | Num- ber. | Gross tonnage. | Valuation. | Num- ber. | Gross tonnage. | Valuation. | Num- ber. | Gross tonnage. | Valuation. |
| Lake Erie..... | 667 | 392,903 | \$22,163,824 | 449 | 296,034 | \$19,583,124 | 151 | 61,097 | \$1,647,700 | 67 | 35,772 | \$933,000 |
| Ashtabula, Ohio..... | 4 | 175 | 27,000 | 4 | 175 | 27,000 | | | | | | |
| Avon, Ohio..... | 1 | 264 | 5,000 | | | | 1 | 264 | 5,000 | | | |
| Buffalo, New York..... | 204 | 128,860 | 8,235,124 | 167 | 109,575 | 7,760,124 | 17 | 10,376 | 290,500 | 20 | 8,909 | 184,500 |
| Cleveland, Ohio..... | 219 | 163,227 | 8,802,800 | 133 | 119,969 | 7,579,500 | 67 | 30,956 | 871,300 | 19 | 12,302 | 352,000 |
| Dunkirk, New York..... | 3 | 522 | 29,000 | 2 | 498 | 27,500 | 1 | 24 | 1,500 | | | |
| Erie, Pennsylvania..... | 37 | 29,454 | 1,759,900 | 33 | 28,142 | 1,723,000 | 3 | 487 | 11,900 | 1 | 825 | 25,000 |
| Fairport, Ohio..... | 5 | 316 | 17,000 | 3 | 81 | 13,500 | 2 | 235 | 3,500 | | | |
| Fremont, Ohio..... | 2 | 20 | 1,800 | 2 | 20 | 1,800 | | | | | | |
| Gratwick, Ohio..... | 1 | 538 | 28,000 | | | | | | | 1 | 538 | 28,000 |
| Huron, Ohio..... | 12 | 5,091 | 274,700 | 8 | 3,532 | 226,000 | 3 | 649 | 13,700 | 1 | 910 | 35,000 |
| Lorain, Ohio..... | 18 | 8,621 | 321,500 | 3 | 1,802 | 157,500 | 13 | 5,442 | 119,500 | 2 | 1,377 | 44,500 |
| Milan, Ohio..... | 6 | 6,824 | 323,500 | 2 | 2,988 | 200,000 | 3 | 1,989 | 58,500 | 1 | 1,847 | 65,000 |
| Norwalk, Ohio..... | 2 | 1,344 | 51,000 | 1 | 723 | 35,000 | | | | 1 | 621 | 16,000 |
| Port Clinton, Ohio..... | 1 | 56 | 5,000 | 1 | 56 | 5,000 | | | | | | |
| Put in Bay, Ohio..... | 1 | 168 | 6,000 | 1 | 168 | 6,000 | | | | | | |
| Suspension Bridge, New York..... | 3 | 346 | 19,000 | 2 | 305 | 18,000 | 1 | 41 | 1,000 | | | |
| Sandusky, Ohio..... | 64 | 18,303 | 865,200 | 42 | 13,331 | 764,200 | 17 | 3,567 | 85,000 | 5 | 1,405 | 16,000 |
| Toledo, Ohio..... | 59 | 18,027 | 907,300 | 32 | 9,968 | 726,000 | 20 | 5,107 | 129,300 | 7 | 2,952 | 52,000 |
| Tonawanda, New York..... | 19 | 5,696 | 287,000 | 12 | 3,100 | 223,000 | | | | 7 | 2,596 | 64,000 |
| Vermilion, New York..... | 6 | 5,051 | 198,000 | 1 | 1,601 | 90,000 | 3 | 1,960 | 57,000 | 2 | 1,490 | 51,000 |
| Lake Ontario..... | 131 | 15,859 | 676,300 | 66 | 5,407 | 460,700 | 63 | 10,018 | 210,600 | 2 | 434 | 5,000 |
| Cape Vincent, New York..... | 52 | 2,220 | 126,500 | 24 | 886 | 94,000 | 28 | 1,334 | 32,500 | | | |
| Charlotte, New York..... | | | | | | | | | | | | |
| Chaumont, New York..... | 1 | 309 | 6,000 | | | | 1 | 309 | 6,000 | | | |
| Hamlin, New York..... | 1 | 175 | 3,000 | | | | 1 | 175 | 3,000 | | | |
| Henderson, New York..... | 1 | 246 | 4,000 | | | | 1 | 246 | 4,000 | | | |
| Medina, New York..... | 1 | 9 | 2,000 | 1 | 9 | 2,000 | | | | | | |
| Oswego, New York..... | 42 | 8,842 | 402,000 | 22 | 3,433 | 289,800 | 20 | 5,409 | 112,200 | | | |
| Pultneyville, New York..... | 1 | 80 | 1,500 | | | | 1 | 80 | 1,500 | | | |
| Rochester, New York..... | 21 | 2,276 | 90,900 | 16 | 999 | 70,000 | 4 | 951 | 16,400 | 1 | 326 | 4,500 |
| Sacketts Harbor, New York..... | 5 | 521 | 7,700 | 1 | 12 | 1,200 | 3 | 401 | 6,000 | 1 | 108 | 500 |
| Sodus Point, New York..... | 2 | 296 | 8,000 | 1 | 18 | 2,000 | 1 | 278 | 6,000 | | | |
| Troy, New York..... | 1 | 555 | 18,000 | | | | 1 | 555 | 18,000 | | | |
| Wilson, New York..... | 2 | 280 | 5,000 | | | | 2 | 280 | 5,000 | | | |
| Youngstown, New York..... | 1 | 50 | 1,700 | 1 | 50 | 1,700 | | | | | | |
| St. Lawrence river..... | 43 | 12,830 | 754,500 | 33 | 10,852 | 731,500 | 4 | 486 | 9,000 | 6 | 1,492 | 14,000 |
| Alexandria Bay, New York..... | 3 | 37 | 5,000 | 3 | 37 | 5,000 | | | | | | |
| Clayton, New York..... | 7 | 1,328 | 69,500 | 5 | 904 | 61,000 | 2 | 424 | 8,500 | | | |
| Ogdensburg, New York..... | 33 | 11,465 | 680,000 | 25 | 9,911 | 665,500 | 2 | 62 | 500 | 6 | 1,492 | 14,000 |

STATISTICS OF TRANSPORTATION.

EQUIPMENT, OCCUPATION,

TABLE 2.—EQUIPMENT OF FLEETS BY CLASSES—NUMBER, TONNAGE, AND VALUE OF ALL STEAMERS, SAILING INDICATIVE OF

| 1 | PORTS. | TOTAL EQUIPMENT. | | | STEAMERS. | | | | | | | | |
|----|--------------------------------|------------------|----------------|--------------|-----------------------|----------------|-------------|---|----------------|--------------|-----------------------------------|----------------|--------------|
| | | Num-ber. | Gross tonnage. | Valuation. | Side-wheel passenger. | | | Propellers carrying both pas-sengers and freight. | | | Propellers carrying freight only. | | |
| | | | | | Num-ber. | Gross tonnage. | Valuation. | Num-ber. | Gross tonnage. | Valuation. | Num-ber. | Gross tonnage. | Valuation. |
| 1 | Total..... | 2,737 | 920,294 | \$48,580,174 | 62 | 27,259 | \$2,600,500 | 303 | 143,907 | \$10,971,124 | 433 | 388,978 | \$23,438,700 |
| 2 | Lake Superior..... | 167 | 39,653 | 2,763,500 | | | | 29 | 12,313 | 1,091,000 | 15 | 13,517 | 898,500 |
| 3 | Ashland, Wisconsin..... | 1 | 73 | 5,000 | | | | 1 | 73 | 5,000 | | | |
| 4 | Baraga, Michigan..... | 3 | 1,319 | 44,000 | | | | | | | | | |
| 5 | Bayfield, Wisconsin..... | 1 | 291 | 6,000 | | | | | | | | | |
| 6 | Duluth, Minnesota..... | 39 | 4,386 | 338,300 | | | | 7 | 714 | 47,500 | 1 | 42 | 4,000 |
| 7 | Marquette, Michigan..... | 111 | 20,759 | 1,532,200 | | | | 19 | 10,521 | 954,500 | 9 | 5,209 | 279,500 |
| 8 | Pequanning, Michigan..... | 4 | 2,082 | 124,000 | | | | 1 | 764 | 70,000 | 1 | 305 | 9,000 |
| 9 | Republic, Michigan..... | 4 | 5,314 | 239,000 | | | | | | | 2 | 3,009 | 156,000 |
| 10 | St. Marys Falls, Michigan..... | 2 | 477 | 25,000 | | | | 1 | 241 | 14,000 | | | |
| 11 | Superior, Wisconsin..... | 2 | 4,952 | 450,000 | | | | | | | 2 | 4,952 | 450,000 |
| 12 | Lakes Huron and St. Clair..... | 726 | 262,833 | 13,107,650 | 23 | 17,729 | 1,864,500 | 43 | 17,972 | 1,296,500 | 138 | 104,477 | 6,221,500 |
| 13 | Algona, Michigan..... | 6 | 2,345 | 46,000 | | | | | | | | | |
| 14 | Alpena, Michigan..... | 9 | 4,984 | 166,400 | | | | 1 | 1,117 | 100,000 | | | |
| 15 | Bay city, Michigan..... | 56 | 31,176 | 1,146,100 | 2 | 865 | 30,000 | 3 | 2,035 | 127,500 | 5 | 4,374 | 289,000 |
| 16 | Cassville, Michigan..... | 1 | 298 | 4,000 | | | | | | | | | |
| 17 | Cheboygan, Michigan..... | 2 | 83 | 7,500 | 1 | 47 | 6,000 | 1 | 36 | 1,500 | | | |
| 18 | Detroit, Michigan..... | 275 | 129,768 | 7,547,800 | 18 | 16,425 | 1,817,000 | 17 | 8,565 | 661,500 | 56 | 56,994 | 3,422,500 |
| 19 | East China, Michigan..... | 2 | 1,449 | 67,000 | | | | | | | | | |
| 20 | East Saginaw, Michigan..... | 30 | 13,291 | 419,000 | 2 | 392 | 11,500 | 4 | 3,607 | 240,000 | | | |
| 21 | Marine, Michigan..... | 23 | 9,875 | 230,800 | | | | | | | 1 | 1,119 | 50,000 |
| 22 | Mount Clemens, Michigan..... | 2 | 504 | 1,500 | | | | | | | | | |
| 23 | New Baltimore, Michigan..... | 2 | 147 | 11,000 | | | | 2 | 147 | 11,000 | | | |
| 24 | Oscoda, Michigan..... | 3 | 1,289 | 17,000 | | | | | | | | | |
| 25 | Port Huron, Michigan..... | 293 | 61,482 | 3,253,950 | | | | 11 | 1,887 | 120,000 | 73 | 40,840 | 2,392,000 |
| 26 | Saginaw, Michigan..... | 10 | 2,829 | 88,500 | | | | 1 | 137 | 7,000 | 2 | 831 | 53,000 |
| 27 | St. Clair, Michigan..... | 12 | 3,343 | 100,500 | | | | 3 | 441 | 28,000 | 1 | 819 | 15,000 |
| 28 | Lake Michigan..... | 1,003 | 196,216 | 9,114,400 | 22 | 5,879 | 501,500 | 96 | 28,256 | 2,048,500 | 105 | 57,027 | 3,511,000 |
| 29 | Benton Harbor, Michigan..... | 3 | 699 | 39,500 | | | | 2 | 655 | 38,500 | | | |
| 30 | Charlevoix, Michigan..... | 6 | 488 | 12,800 | | | | 2 | 83 | 7,000 | | | |
| 31 | Chicago, Illinois..... | 339 | 71,200 | 3,088,350 | 5 | 523 | 39,000 | 34 | 13,181 | 1,075,500 | 28 | 10,960 | 673,000 |
| 32 | Escanaba, Michigan..... | 5 | 1,615 | 52,000 | | | | 1 | 448 | 25,000 | | | |
| 33 | Fort Howard, Wisconsin..... | 2 | 222 | 5,500 | | | | | | | | | |
| 34 | Frankfort, Michigan..... | 1 | 7 | 1,000 | | | | | | | | | |
| 35 | Grand Haven, Michigan..... | 225 | 22,308 | 1,608,650 | 6 | 1,650 | 204,000 | 31 | 5,750 | 450,000 | 23 | 6,305 | 464,500 |
| 36 | Green Bay, Wisconsin..... | 10 | 3,300 | 115,000 | 1 | 95 | 4,000 | 3 | 900 | 55,000 | | | |
| 37 | Holland, Michigan..... | 2 | 220 | 3,000 | | | | | | | | | |
| 38 | Kenosha, Wisconsin..... | 19 | 7,378 | 358,900 | 4 | 2,459 | 194,000 | 2 | 1,578 | 110,000 | | | |
| 39 | Kewaunee, Wisconsin..... | 1 | 160 | 3,000 | | | | | | | | | |
| 40 | Ludington, Michigan..... | 4 | 752 | 12,000 | | | | | | | | | |
| 41 | Manistee, Michigan..... | 11 | 2,732 | 54,000 | 1 | 530 | 25,000 | | | | | | |
| 42 | Manitowoc, Wisconsin..... | 15 | 1,775 | 34,600 | | | | | | | | | |
| 43 | Menominee, Michigan..... | 1 | 277 | 2,500 | | | | | | | | | |
| 44 | Milwaukee, Wisconsin..... | 259 | 61,694 | 3,205,000 | 5 | 613 | 35,500 | 12 | 3,282 | 166,000 | 53 | 39,172 | 2,340,500 |
| 45 | Montague, Michigan..... | 2 | 217 | 4,000 | | | | | | | | | |
| 46 | Muskegon, Michigan..... | 17 | 3,088 | 63,100 | | | | 2 | 504 | 24,000 | | | |
| 47 | Northport, Michigan..... | 1 | 63 | 7,000 | | | | 1 | 63 | 7,000 | | | |
| 48 | Onekama, Michigan..... | 1 | 146 | 3,500 | | | | | | | | | |
| 49 | Pentwater, Michigan..... | 2 | 260 | 4,500 | | | | | | | | | |
| 50 | Peshigo, Wisconsin..... | 3 | 1,704 | 52,500 | | | | | | | | | |
| 51 | Petoskey, Michigan..... | 1 | 123 | 12,000 | | | | 1 | 123 | 12,000 | | | |
| 52 | Racine, Wisconsin..... | 26 | 6,932 | 145,400 | | | | | | | | | |
| 53 | St. James, Michigan..... | 1 | 81 | 1,500 | | | | | | | | | |
| 54 | St. Joseph, Michigan..... | 2 | 164 | 1,000 | | | | | | | | | |
| 55 | Saugatuck, Michigan..... | 3 | 647 | 33,500 | | | | 3 | 647 | 33,500 | | | |
| 56 | Sheboygan, Wisconsin..... | 25 | 4,115 | 79,900 | | | | | | | | | |
| 57 | South Haven, Michigan..... | 4 | 374 | 5,100 | | | | | | | | | |
| 58 | Spring Lake, Michigan..... | 2 | 315 | 8,000 | | | | | | | | | |
| 59 | Sturgeon Bay, Wisconsin..... | 2 | 550 | 5,000 | | | | | | | | | |
| 60 | Suttons Bay, Michigan..... | 1 | 232 | 3,000 | | | | | | | | | |
| 61 | Traverse, Michigan..... | 1 | 336 | 20,000 | | | | 1 | 336 | 20,000 | | | |
| 62 | Troy, Wisconsin..... | 1 | 301 | 7,000 | | | | | | | | | |
| 63 | Waukegan, Illinois..... | 2 | 1,296 | 58,000 | | | | 1 | 706 | 25,000 | 1 | 590 | 33,000 |
| 64 | Waukegan, Wisconsin..... | 1 | 48 | 600 | | | | | | | | | |
| 65 | Whitehall, Michigan..... | 2 | 307 | 4,000 | | | | | | | | | |
| 66 | Lake Erie..... | 667 | 392,903 | 22,163,824 | 10 | 2,221 | 144,000 | 91 | 83,818 | 6,342,724 | 166 | 202,224 | 12,065,700 |
| 67 | Ashtabula, Ohio..... | 4 | 175 | 27,000 | | | | | | | | | |
| 68 | Avon, Ohio..... | 1 | 264 | 5,000 | | | | | | | | | |
| 69 | Buffalo, New York..... | 204 | 128,860 | 8,235,124 | | | | 43 | 34,542 | 2,767,424 | 50 | 72,066 | 4,546,000 |
| 70 | Cleveland, Ohio..... | 219 | 163,227 | 8,892,800 | 1 | 36 | 4,000 | 19 | 33,986 | 2,540,000 | 66 | 83,979 | 4,795,500 |
| 71 | Dunkirk, New York..... | 3 | 522 | 29,000 | | | | | | | 1 | 480 | 25,000 |

TRANSPORTATION ON THE GREAT LAKES.

295

AND CONSTRUCTION—Continued.

VESSELS, AND UNRIGGED CRAFT REPORTED ON IN THE PRECEDING TABLE, BUT DIVIDED INTO CLASSES OCCUPATION AND RIG.

| STEAMERS—continued. | | | | | | SAIL AND UNRIGGED VESSELS. | | | | | | | | | |
|---------------------|-------------------|-------------|--------------------|-------------------|-------------|----------------------------|-------------------|-------------|--------------|-------------------|-------------|--------------------|-------------------|------------|----|
| Tugs. | | | All other classes. | | | Schooners. | | | Lake barges. | | | All other classes. | | | |
| Num- ber. | Gross tonnage. | Valuation. | Num- ber. | Gross tonnage. | Valuation. | Num- ber. | Gross tonnage. | Valuation. | Num- ber. | Gross tonnage. | Valuation. | Num- ber. | Gross tonnage. | Valuation. | |
| 489 | 24,451 | \$2,556,300 | 180 | 11,218 | \$1,302,200 | 917 | 184,029 | \$4,217,200 | 301 | 138,404 | \$3,463,500 | 52 | 2,048 | \$30,650 | 1 |
| 67 | 2,849 | 306,300 | 15 | 578 | 48,500 | 31 | 2,784 | 74,200 | 10 | 7,612 | 345,000 | | | | 2 |
| 1 | 35 | 6,000 | | | | | | | 2 | 1,284 | 38,000 | | | | 3 |
| 22 | 722 | 97,800 | 5 | 136 | 12,500 | 1 | 291 | 6,000 | 3 | 2,684 | 175,000 | | | | 4 |
| 43 | 1,856 | 191,500 | 10 | 442 | 36,000 | 29 | 2,405 | 66,700 | 1 | 326 | 4,000 | | | | 5 |
| | | | | | | | | | 2 | 1,013 | 45,000 | | | | 6 |
| | | | | | | | | | 2 | 2,305 | 83,000 | | | | 7 |
| 1 | 236 | 11,000 | | | | | | | | | | | | | 8 |
| | | | | | | | | | | | | | | | 9 |
| | | | | | | | | | | | | | | | 10 |
| 102 | 8,383 | 639,600 | 34 | 3,902 | 499,500 | 203 | 33,639 | 805,500 | 171 | 75,849 | 1,772,500 | 12 | 882 | 8,050 | 11 |
| | | | | | | | | | | | | | | | 12 |
| 1 | 12 | 1,000 | | | | | | | 6 | 2,345 | 46,000 | | | | 13 |
| | | | | | | | | | 8 | 3,867 | 66,400 | | | | 14 |
| | | | | | | | | | 38 | 20,265 | 571,200 | | | | 15 |
| | | | | | | | | | | | | | | | 16 |
| 34 | 3,671 | 272,000 | 19 | 3,251 | 421,000 | 83 | 19,074 | 411,900 | 44 | 21,387 | 537,300 | 4 | 401 | 4,600 | 17 |
| | | | | | | | | | 2 | 1,449 | 67,000 | | | | 18 |
| | | | | | | | | | 22 | 8,486 | 154,100 | | | | 19 |
| | | | | | | | | | 17 | 6,718 | 140,300 | | | | 20 |
| | | | | | | | | | 1 | 364 | 500 | 1 | 140 | 1,000 | 21 |
| | | | | | | | | | | | | | | | 22 |
| 66 | 4,604 | 362,600 | | | | 1 | 591 | 12,000 | 2 | 698 | 5,000 | | | | 23 |
| 1 | 36 | 4,000 | 15 | 651 | 78,500 | 100 | 6,302 | 182,200 | 21 | 6,797 | 116,200 | 7 | 341 | 2,450 | 24 |
| | | | | | | 1 | 252 | 500 | 5 | 1,573 | 24,000 | | | | 25 |
| | | | | | | 3 | 683 | 13,000 | 5 | 1,900 | 44,500 | | | | 26 |
| 184 | 7,949 | 836,100 | 46 | 2,689 | 330,500 | 488 | 76,442 | 1,481,500 | 46 | 17,353 | 394,500 | 16 | 621 | 10,800 | 27 |
| | | | | | | | | | | | | | | | 28 |
| | | | | | | 1 | 44 | 1,000 | | | | | | | 29 |
| 74 | 2,469 | 298,800 | 15 | 1,677 | 171,500 | 4 | 405 | 5,800 | | | | | | | 30 |
| | | | | | | 155 | 35,859 | 710,000 | 18 | 6,255 | 115,000 | 10 | 336 | 5,550 | 31 |
| | | | | | | 4 | 1,167 | 27,000 | | | | | | | 32 |
| | | | | | | 2 | 222 | 5,500 | | | | | | | 33 |
| 1 | 7 | 1,000 | | | | | | | | | | | | | 34 |
| 64 | 2,572 | 261,800 | 23 | 575 | 67,000 | 74 | 4,784 | 122,400 | 1 | 618 | 38,000 | 3 | 45 | 950 | 35 |
| | | | | | | 3 | 955 | 27,500 | 3 | 1,350 | 28,500 | | | | 36 |
| | | | | | | 2 | 220 | 3,000 | | | | | | | 37 |
| | | | | | | 12 | 3,145 | 52,900 | 1 | 196 | 2,000 | | | | 38 |
| | | | | | | | | | | | | | | | 39 |
| | | | | | | 1 | 160 | 3,000 | | | | | | | 40 |
| | | | | | | 4 | 752 | 12,000 | | | | | | | 41 |
| | | | | | | 9 | 1,890 | 25,000 | 1 | 312 | 4,000 | | | | 42 |
| | | | | | | 15 | 1,775 | 34,600 | | | | | | | 43 |
| 45 | 2,901 | 274,500 | 8 | 437 | 92,000 | 129 | 13,034 | 247,200 | 1 | 277 | 2,500 | | | | 44 |
| | | | | | | 2 | 217 | 4,000 | 6 | 2,246 | 49,000 | 1 | 9 | 300 | 45 |
| | | | | | | 15 | 2,584 | 39,100 | | | | | | | 46 |
| | | | | | | | | | | | | | | | 47 |
| | | | | | | | | | | | | | | | 48 |
| | | | | | | 2 | 260 | 4,500 | | | | 1 | 146 | 3,500 | 49 |
| | | | | | | | | | | | | | | | 50 |
| | | | | | | | | | 3 | 1,704 | 52,500 | | | | 51 |
| | | | | | | 15 | 2,883 | 47,400 | 10 | 3,964 | 97,500 | 1 | 85 | 500 | 52 |
| | | | | | | 1 | 81 | 1,500 | | | | | | | 53 |
| | | | | | | | | | | | | | | | 54 |
| | | | | | | 2 | 164 | 1,000 | | | | | | | 55 |
| | | | | | | | | | | | | | | | 56 |
| | | | | | | 24 | 3,914 | 76,900 | 1 | 201 | 3,000 | | | | 57 |
| | | | | | | 4 | 374 | 5,100 | | | | | | | 58 |
| | | | | | | | | | | | | | | | 59 |
| | | | | | | 2 | 345 | 8,000 | | | | | | | 60 |
| | | | | | | 1 | 320 | 2,500 | 1 | 230 | 2,500 | | | | 61 |
| | | | | | | 1 | 232 | 3,000 | | | | | | | 62 |
| | | | | | | | | | | | | | | | 63 |
| | | | | | | 1 | 301 | 7,000 | | | | | | | 64 |
| | | | | | | | | | | | | | | | 65 |
| | | | | | | 1 | 48 | 600 | | | | | | | 66 |
| | | | | | | 2 | 307 | 4,000 | | | | | | | 67 |
| 123 | 4,806 | 702,000 | 59 | 2,965 | 328,700 | 148 | 61,014 | 1,645,200 | 67 | 35,772 | 933,000 | 3 | 83 | 2,500 | 68 |
| 4 | 175 | 27,000 | | | | | | | | | | | | | 69 |
| 54 | 2,057 | 317,500 | 20 | 910 | 129,200 | 1 | 264 | 5,000 | | | | | | | 70 |
| 29 | 1,002 | 134,000 | 18 | 966 | 106,000 | 17 | 10,376 | 290,500 | 20 | 8,909 | 184,500 | | | | 71 |
| | | | 1 | 88 | 2,500 | 64 | 30,873 | 868,800 | 19 | 12,302 | 352,000 | 3 | 83 | 2,500 | 72 |
| | | | | | | 1 | 24 | 1,500 | | | | | | | 73 |

STATISTICS OF TRANSPORTATION.

EQUIPMENT, OCCUPATION, AND

TABLE 2.—EQUIPMENT OF FLEETS

| PORTS. | TOTAL EQUIPMENT. | | | STEAMERS. | | | | | | | | |
|-------------------------------------|------------------|----------------|-------------|------------------------|----------------|------------|--|----------------|------------|-----------------------------------|----------------|-------------|
| | | | | Side-wheel passengers. | | | Propellers carrying both passengers and freight. | | | Propellers carrying freight only. | | |
| | Num-ber. | Gross tonnage. | Valuation. | Num-ber. | Gross tonnage. | Valuation. | Num-ber. | Gross tonnage. | Valuation. | Num-ber. | Gross tonnage. | Valuation. |
| Lake Erie—Continued. | | | | | | | | | | | | |
| 1 Erie, Pennsylvania..... | 37 | 20,454 | \$1,759,900 | | | | 9 | 5,004 | \$330,500 | 14 | 22,633 | \$1,347,000 |
| 2 Fairport, Ohio..... | 5 | 316 | 17,000 | | | | | | | | | |
| 3 Fremont, Ohio..... | 2 | 20 | 1,800 | | | | 1 | 11 | 800 | | | |
| 4 Gratiwick, Ohio..... | 1 | 538 | 28,000 | | | | | | | | | |
| 5 Huron, Ohio..... | 12 | 5,091 | 274,700 | | | | | | | 2 | 3,433 | 204,000 |
| 6 Lorain, Ohio..... | 18 | 8,621 | 321,500 | | | | | | | 1 | 1,759 | 150,000 |
| 7 Milan, Ohio..... | 6 | 6,824 | 323,500 | | | | 1 | 2,279 | 140,000 | 1 | 709 | 60,000 |
| 8 Norwalk, Ohio..... | 2 | 1,344 | 51,000 | | | | | | | 1 | 723 | 35,000 |
| 9 Port Clinton, Ohio..... | 1 | 56 | 5,000 | | | | | | | | | |
| 10 Put in Bay, Ohio..... | 1 | 168 | 6,000 | 1 | 168 | \$6,000 | | | | | | |
| 11 Suspension Bridge, New York..... | 3 | 346 | 19,000 | | | | | | | 1 | 276 | 15,000 |
| 12 Sandusky, Ohio..... | 64 | 18,303 | 865,200 | 6 | 1,273 | 99,000 | 9 | 495 | 45,500 | 19 | 11,274 | 583,200 |
| 13 Toledo, Ohio..... | 59 | 18,027 | 907,300 | 2 | 744 | 35,000 | 4 | 4,528 | 318,500 | 9 | 3,311 | 215,000 |
| 14 Tonawanda, New York..... | 19 | 5,696 | 287,000 | | | | 5 | 2,973 | 200,000 | | | |
| 15 Vermilion, New York..... | 6 | 5,051 | 198,000 | | | | | | | 1 | 1,601 | 90,000 |
| 16 Lake Ontario..... | 131 | 15,859 | 676,300 | 4 | 553 | 32,500 | 32 | 1,155 | 155,900 | 3 | 2,906 | 174,000 |
| 17 Cape Vincent, New York..... | 52 | 2,220 | 126,500 | 2 | 85 | 14,000 | 15 | 586 | 56,500 | 1 | 72 | 4,000 |
| 18 Charlotte, New York..... | | | | | | | | | | | | |
| 19 Chaumont, New York..... | 1 | 309 | 6,000 | | | | | | | | | |
| 20 Hamlin, New York..... | 1 | 175 | 3,000 | | | | | | | | | |
| 21 Henderson, New York..... | 1 | 246 | 4,000 | | | | | | | | | |
| 22 Medina, New York..... | 1 | 9 | 2,000 | | | | | | | | | |
| 23 Oswego, New York..... | 42 | 8,842 | 402,000 | | | | 7 | 225 | 68,500 | 2 | 2,834 | 170,000 |
| 24 Pultneyville, New York..... | 1 | 80 | 1,500 | | | | | | | | | |
| 25 Rochester, New York..... | 21 | 2,276 | 90,900 | 2 | 468 | 18,500 | 7 | 264 | 26,000 | | | |
| 26 Sacketts Harbor, New York..... | 5 | 521 | 7,700 | | | | 1 | 12 | 1,200 | | | |
| 27odus Point, New York..... | 2 | 296 | 8,000 | | | | 1 | 18 | 2,000 | | | |
| 28 Troy, New York..... | 1 | 555 | 18,000 | | | | | | | | | |
| 29 Wilson, New York..... | 2 | 280 | 5,000 | | | | | | | | | |
| 30 Youngstown, New York..... | 1 | 50 | 1,700 | | | | 1 | 50 | 1,700 | | | |
| 31 St. Lawrence river..... | 43 | 12,830 | 754,500 | 3 | 877 | 58,000 | 12 | 393 | 36,500 | 6 | 8,827 | 568,000 |
| 32 Alexandria Bay, New York..... | 3 | 37 | 5,000 | | | | 3 | 37 | 5,000 | | | |
| 33 Clayton, New York..... | 7 | 1,328 | 69,500 | 3 | 877 | 58,000 | 2 | 27 | 3,000 | | | |
| 34 Ogdensburg, New York..... | 33 | 11,465 | 680,000 | | | | 7 | 329 | 28,500 | 6 | 8,827 | 568,000 |

TRANSPORTATION ON THE GREAT LAKES.

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CONSTRUCTION—Continued.

BY CLASSES, ETC.—Continued.

| STEAMERS—continued. | | | | | | SAIL AND UNRIGGED VESSELS. | | | | | | | | |
|---------------------|-------------------|------------|--------------------|-------------------|------------|----------------------------|-------------------|------------|--------------|-------------------|------------|--------------------|-------------------|------------|
| Tugs. | | | All other classes. | | | Schooners. | | | Lake barges. | | | All other classes. | | |
| Num- ber. | Gross tonnage. | Valuation. | Num- ber. | Gross tonnage. | Valuation. | Num- ber. | Gross tonnage. | Valuation. | Num- ber. | Gross tonnage. | Valuation. | Num- ber. | Gross tonnage. | Valuation. |
| 4 | 103 | \$16,000 | 6 | 402 | \$29,500 | 3 | 487 | \$11,900 | 1 | 825 | \$25,000 | | | |
| 2 | 66 | 10,500 | 1 | 15 | 3,000 | 2 | 235 | 3,500 | | | | | | |
| | | | 1 | 9 | 1,000 | | | | | | | | | |
| | | | 6 | 99 | 22,000 | 3 | 649 | 13,700 | 1 | 538 | 28,000 | | | |
| | | | | | | | | | 1 | 910 | 35,000 | | | |
| 2 | 43 | 7,500 | | | | 13 | 5,442 | 119,500 | 2 | 1,377 | 44,500 | | | |
| | | | | | | 3 | 1,989 | 58,500 | 1 | 1,847 | 65,000 | | | |
| 1 | 56 | 5,000 | | | | | | | 1 | 621 | 16,000 | | | |
| | | | | | | | | | | | | | | |
| 1 | 29 | 3,000 | | | | 1 | 41 | 1,000 | | | | | | |
| 5 | 232 | 26,000 | 3 | 57 | 10,500 | 17 | 3,567 | 85,000 | 5 | 1,405 | 16,000 | | | |
| 14 | 916 | 132,500 | 3 | 469 | 25,000 | 20 | 5,107 | 129,300 | 7 | 2,952 | 52,000 | | | |
| 7 | 127 | 23,000 | | | | | | | 7 | 2,596 | 64,000 | | | |
| | | | | | | 3 | 1,960 | 57,000 | 2 | 1,490 | 51,000 | | | |
| 8 | 185 | 36,800 | 19 | 608 | 61,500 | 45 | 9,726 | 202,300 | 1 | 326 | 4,500 | 10 | 400 | \$8,800 |
| | | | | | | | | | | | | | | |
| | | | 6 | 143 | 19,500 | 12 | 1,058 | 24,600 | | | | 16 | 270 | 7,000 |
| | | | | | | 1 | 309 | 6,000 | | | | | | |
| | | | | | | 1 | 175 | 3,000 | | | | | | |
| | | | | | | 1 | 246 | 4,000 | | | | | | |
| | | | 1 | 9 | 2,000 | | | | | | | | | |
| 8 | 185 | 36,800 | 5 | 189 | 14,500 | 18 | 5,393 | 111,800 | | | | 2 | 16 | 400 |
| | | | | | | 1 | 80 | 1,500 | | | | | | |
| | | | 7 | 207 | 25,500 | 4 | 951 | 10,400 | 1 | 326 | 4,500 | | | |
| | | | | | | 3 | 401 | 6,000 | | | | 1 | 108 | 500 |
| | | | | | | | | | | | | | | |
| | | | | | | 1 | 278 | 6,000 | | | | | | |
| | | | | | | 1 | 555 | 18,000 | | | | | | |
| | | | | | | 2 | 280 | 5,000 | | | | | | |
| | | | | | | | | | | | | | | |
| 5 | 279 | 35,500 | 7 | 476 | 33,500 | 2 | 424 | 8,500 | 6 | 1,492 | 14,000 | 2 | 62 | 500 |
| | | | | | | | | | | | | | | |
| 5 | 279 | 35,500 | 7 | 476 | 33,500 | 2 | 424 | 8,500 | 6 | 1,492 | 14,000 | 2 | 62 | 500 |

STATISTICS OF TRANSPORTATION.

EQUIPMENT, OCCUPATION, AND CONSTRUCTION—Continued.

TABLE 3.—PERCENTAGES OF TONNAGE AND VALUATION—NUMBER, GROSS AND NET TONNAGE, AND ESTIMATED CARRYING CAPACITY, COMMERCIAL VALUATION AND VALUE PER GROSS TON OF ALL STEAMERS, SAILING VESSELS, AND UNRIGGED CRAFT; ARRANGED BY PERCENTAGES OF TONNAGE AND VALUATION APPLIED TO THE LAKES AND ST. LAWRENCE RIVER BY CLASS ENTRIES.

ALL LAKES AND ST. LAWRENCE RIVER.

| CLASSES OF VESSELS. | Number. | TONNAGE. | | | | VALUATION. | | | | Per ton, gross. |
|---|---------|----------|-------------------------------|--|---------|------------------------------|--------------|---------------------------------|--|-----------------|
| | | Gross. | Percentage of— | | Net. | Estimated carrying capacity. | Commercial. | Percentage of— | | |
| | | | Total tonnage on Great Lakes. | Total tonnage of class named on all the lakes. | | | | Total valuation on Great Lakes. | Total valuation of class named on all the lakes. | |
| All classes | 2,737 | 920,294 | 100.00 | 100.00 | 776,817 | 1,248,784 | \$48,580,174 | 100.00 | 100.00 | \$53.00 |
| Steamers: | | | | | | | | | | |
| Side-wheel passenger | 62 | 27,259 | 2.96 | 100.00 | 19,465 | 27,633 | 2,600,500 | 5.35 | 100.00 | 95.00 |
| Propellers carrying both passengers and freight | 303 | 143,907 | 15.64 | 100.00 | 112,585 | 157,085 | 10,971,124 | 22.58 | 100.00 | 70.00 |
| Propellers carrying freight only | 433 | 388,978 | 42.26 | 100.00 | 314,875 | 453,574 | 23,438,700 | 48.25 | 100.00 | 60.00 |
| Tugs | 489 | 24,451 | 2.66 | 100.00 | 14,292 | 14,352 | 2,556,300 | 5.26 | 100.00 | 105.00 |
| Ferry | 40 | 4,702 | 0.51 | 100.00 | 2,933 | 3,849 | 498,000 | 1.03 | 100.00 | 106.00 |
| Pleasure yachts | 54 | 2,121 | 0.23 | 100.00 | 1,320 | 1,128 | 312,700 | 0.64 | 100.00 | 147.00 |
| Pile drivers | 15 | 247 | 0.03 | 100.00 | 150 | 77 | 53,500 | 0.11 | 100.00 | 217.00 |
| Sand dredges | 4 | 398 | 0.04 | 100.00 | 295 | 431 | 14,000 | 0.03 | 100.00 | 85.00 |
| Sand boats | 1 | 81 | 0.01 | 100.00 | 71 | 102 | 5,000 | 0.01 | 100.00 | 62.00 |
| Fire boats | 7 | 681 | 0.07 | 100.00 | 319 | 354 | 195,000 | 0.40 | 100.00 | 309.00 |
| Steam lighters | 4 | 393 | 0.04 | 100.00 | 368 | 339 | 14,000 | 0.03 | 100.00 | 86.00 |
| Unclassified steam vessels | 55 | 2,646 | 0.29 | 100.00 | 1,913 | 1,895 | 210,000 | 0.43 | 100.00 | 79.00 |
| Sail and unrigged vessels: | | | | | | | | | | |
| Schooners | 917 | 184,029 | 20.00 | 100.00 | 174,869 | 334,360 | 4,217,200 | 8.68 | 100.00 | 23.00 |
| Lake barges | 301 | 188,404 | 15.04 | 100.00 | 181,407 | 249,847 | 3,463,500 | 7.13 | 100.00 | 25.00 |
| Scows | 7 | 996 | 0.11 | 100.00 | 952 | 1,833 | 9,000 | 0.02 | 100.00 | 9.00 |
| Sloops | 44 | 1,035 | 0.11 | 100.00 | 986 | 1,943 | 21,350 | 0.05 | 100.00 | 21.00 |
| Yawls | 1 | 17 | | 100.00 | 17 | 32 | 300 | | 100.00 | 18.00 |

LAKE SUPERIOR.

[illegible]

LAKES HURON AND ST. CLAIR.

[illegible]

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TABLE 3.—PERCENTAGES OF TONNAGE AND VALUATION, ETC.—Continued.

LAKE MICHIGAN.

[illegible]

LAKE ERIE.

| All classes..... | 667 | 392,903 | 100.00 | 42.69 | 332,991 | 518,134 | 22,103,824 | 100.00 | 45.63 | 566,125 |
|--|-----|---------|--------|--------|---------|---------|------------|--------|--------|---------|
| Steamers: | | | | | | | | | | |
| Side-wheel passenger..... | 10 | 2,221 | 0.57 | 8.15 | 1,505 | 2,482 | 144,000 | 0.65 | 5.54 | 65,000 |
| Propellers carrying both passengers and freight..... | 91 | 83,818 | 21.33 | 58.24 | 67,056 | 94,470 | 6,342,724 | 28.62 | 57.81 | 78,000 |
| Propellers carrying freight only..... | 166 | 202,224 | 51.47 | 51.99 | 167,518 | 241,707 | 12,065,700 | 54.44 | 51.48 | 60,000 |
| Tugs..... | 123 | 4,806 | 1.22 | 19.66 | 2,734 | 2,180 | 702,000 | 3.17 | 27.46 | 146,000 |
| Ferry..... | 5 | 284 | 0.07 | 6.04 | 189 | 229 | 19,000 | 0.09 | 3.22 | 127,000 |
| Pleasure yachts..... | 20 | 1,050 | 0.27 | 49.79 | 653 | 730 | 136,700 | 0.62 | 43.72 | 62,000 |
| Pile drivers..... | 14 | 242 | 0.06 | 97.98 | 145 | 74 | 49,500 | 0.22 | 92.52 | 205,000 |
| Sand dredges..... | 4 | 398 | 0.10 | 100.00 | 295 | 431 | 14,000 | 0.06 | 100.00 | 35,000 |
| Sand boats..... | 1 | 81 | 0.02 | 100.00 | 71 | 102 | 5,000 | 0.02 | 100.00 | 62,000 |
| Fire boats..... | 2 | 199 | 0.05 | 31.54 | 100 | 114 | 60,060 | 0.27 | 30.77 | 202,000 |
| Steam lighters..... | 4 | 392 | 0.10 | 100.00 | 308 | 339 | 14,000 | 0.06 | 100.00 | 96,000 |
| Unclassified steam vessels..... | 9 | 313 | 0.08 | 11.83 | 229 | 176 | 30,500 | 0.14 | 14.52 | 37,000 |
| Sail and unrigged vessels: | | | | | | | | | | |
| Schooners..... | 148 | 61,014 | 15.53 | 33.15 | 58,009 | 110,486 | 1,645,200 | 7.42 | 39.01 | 26,000 |
| Lake barges..... | 67 | 35,772 | 9.11 | 25.85 | 33,950 | 64,464 | 933,000 | 4.21 | 26.94 | 27,000 |
| Scows..... | | | | | | | | | | |
| Sloops..... | 2 | 66 | 0.02 | 6.38 | 62 | 118 | 2,200 | 0.01 | 10.30 | 33,000 |
| Yawls..... | 1 | 17 | | 100.00 | 17 | 32 | 300 | | 100.00 | 18,000 |

LAKE ONTARIO.

[illegible]

STATISTICS OF TRANSPORTATION.

EQUIPMENT, OCCUPATION, AND CONSTRUCTION—Continued.

TABLE 3.—PERCENTAGES OF TONNAGE AND VALUATION—Continued.

ST. LAWRENCE RIVER.

[illegible]

TRANSPORTATION ON THE GREAT LAKES.

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EQUIPMENT, OCCUPATION, AND CONSTRUCTION—Continued.

TABLE 4.—OCCUPATION BY CLASS GROUPS—NUMBER, GROSS AND NET TONNAGE, AND ESTIMATED CARRYING CAPACITY COMMERCIAL VALUE, AND VALUE PER GROSS TON OF ALL STEAMERS, SAILING VESSELS, AND UNRIGGED CRAFT; GROUPED BY CLASSES, AND ENTERED BY CLASS TOTALS FOR EACH OF THE LAKES AND ST. LAWRENCE RIVER.

| LAKES AND RIVER. | Number. | Gross tonnage. | Net tonnage. | Estimated carrying capacity (tons). | Commercial valuation. | Valuation per gross ton. |
|-----------------------------------|---------|----------------|--------------|-------------------------------------|-----------------------|--------------------------|
| Summary of entire lake fleet..... | 2, 737 | 920, 294 | 776, 817 | 1, 248, 784 | \$48, 580, 174 | \$53 |

SIDE-WHEEL PASSENGER STEAMERS.

| | | | | | | |
|---------------------------------|----|---------|---------|---------|-------------|-----|
| Total | 62 | 27, 259 | 19, 465 | 27, 633 | 2, 600, 500 | 95 |
| Lake Superior | 23 | 17, 729 | 12, 570 | 17, 828 | 1, 864, 500 | 105 |
| Lakes Huron and St. Clair | 22 | 5, 879 | 4, 501 | 6, 257 | 501, 500 | 85 |
| Lake Michigan | 10 | 2, 221 | 1, 505 | 2, 482 | 144, 000 | 65 |
| Lake Erie | 4 | 553 | 397 | 442 | 32, 500 | 59 |
| Lake Ontario | 3 | 877 | 492 | 624 | 58, 000 | 66 |
| St. Lawrence river..... | | | | | | |

PROPELLERS CARRYING BOTH PASSENGERS AND FREIGHT.

| | | | | | | |
|---------------------------------|-----|----------|----------|----------|--------------|-----|
| Total | 303 | 143, 907 | 112, 585 | 157, 035 | 10, 971, 124 | 76 |
| Lake Superior | 29 | 12, 313 | 9, 176 | 11, 390 | 1, 091, 000 | 89 |
| Lakes Huron and St. Clair | 43 | 17, 972 | 13, 391 | 19, 656 | 1, 296, 500 | 72 |
| Lake Michigan | 96 | 28, 256 | 22, 044 | 30, 909 | 2, 048, 500 | 72 |
| Lake Erie | 91 | 83, 818 | 67, 056 | 94, 470 | 6, 342, 724 | 76 |
| Lake Ontario | 32 | 1, 155 | 685 | 482 | 155, 900 | 135 |
| St. Lawrence river | 12 | 393 | 233 | 128 | 36, 500 | 93 |

PROPELLERS CARRYING FREIGHT ONLY.

| | | | | | | |
|---------------------------------|-----|----------|----------|----------|--------------|----|
| Total | 433 | 388, 978 | 314, 875 | 453, 574 | 23, 438, 700 | 60 |
| Lake Superior | 15 | 13, 517 | 10, 666 | 14, 666 | 898, 500 | 66 |
| Lakes Huron and St. Clair | 138 | 104, 477 | 82, 692 | 120, 202 | 6, 221, 500 | 60 |
| Lake Michigan | 105 | 57, 027 | 44, 215 | 65, 613 | 3, 511, 000 | 62 |
| Lake Erie | 166 | 202, 224 | 167, 518 | 241, 707 | 12, 066, 700 | 60 |
| Lake Ontario | 3 | 2, 006 | 2, 209 | 3, 190 | 174, 000 | 60 |
| St. Lawrence river | 6 | 8, 827 | 7, 575 | 8, 187 | 568, 000 | 64 |

TUGS.

| | | | | | | |
|---------------------------------|-----|---------|---------|---------|-------------|-----|
| Total | 489 | 24, 451 | 14, 292 | 14, 352 | 2, 556, 300 | 105 |
| Lake Superior | 67 | 2, 849 | 1, 607 | 1, 322 | 306, 300 | 108 |
| Lakes Huron and St. Clair | 102 | 8, 383 | 5, 068 | 6, 092 | 639, 600 | 76 |
| Lake Michigan | 184 | 7, 949 | 4, 649 | 4, 582 | 836, 100 | 105 |
| Lake Erie | 123 | 4, 806 | 2, 734 | 2, 180 | 702, 000 | 146 |
| Lake Ontario | 8 | 185 | 93 | 49 | 36, 800 | 199 |
| St. Lawrence river | 5 | 279 | 141 | 127 | 35, 500 | 127 |

FERRY.

| | | | | | | |
|---------------------------------|----|--------|--------|--------|----------|-----|
| Total | 40 | 4, 702 | 2, 933 | 3, 819 | 498, 000 | 106 |
| Lake Superior | 6 | 365 | 265 | 310 | 23, 500 | 64 |
| Lakes Huron and St. Clair | 16 | 3, 436 | 2, 103 | 2, 939 | 410, 000 | 119 |
| Lake Michigan | 10 | 234 | 144 | 80 | 29, 500 | 128 |
| Lake Erie | 5 | 284 | 189 | 220 | 19, 000 | 67 |
| Lake Ontario | 1 | 100 | 95 | 137 | 2, 000 | 18 |
| St. Lawrence river | 2 | 274 | 137 | 154 | 14, 000 | 51 |

PLEASURE YACHTS.

| | | | | | | |
|---------------------------------|----|--------|--------|--------|----------|-----|
| Total | 54 | 2, 121 | 1, 320 | 1, 128 | 312, 700 | 147 |
| Lake Superior | 4 | 123 | 81 | 41 | 17, 500 | 142 |
| Lakes Huron and St. Clair | 11 | 367 | 249 | 128 | 74, 000 | 202 |
| Lake Michigan | 4 | 163 | 109 | 113 | 26, 000 | 160 |
| Lake Erie | 20 | 1, 056 | 653 | 730 | 136, 700 | 129 |
| Lake Ontario | 13 | 339 | 192 | 98 | 51, 000 | 150 |
| St. Lawrence river | 2 | 73 | 36 | 18 | 7, 500 | 103 |

STATISTICS OF TRANSPORTATION.

EQUIPMENT, OCCUPATION, AND CONSTRUCTION—Continued.

TABLE 4.—OCCUPATION BY CLASS GROUPS—Continued.

PILE DRIVERS.

| LAKES AND RIVER. | Number. | Gross tonnage. | Net tonnage. | Estimated carrying capacity (tons). | Commercial valuation. | Valuation per gross ton. |
|---------------------------------|---------|----------------|--------------|-------------------------------------|-----------------------|--------------------------|
| Total | 15 | 247 | 150 | 77 | \$53,500 | \$217 |
| Lake Superior | 1 | 5 | 5 | 3 | 4,000 | 800 |
| Lakes Huron and St. Clair | 14 | 242 | 145 | 74 | 49,500 | 205 |
| Lake Michigan | | | | | | |
| Lake Erie | | | | | | |
| Lake Ontario | | | | | | |
| St. Lawrence river | | | | | | |

SAND DREDGES.

| | | | | | | |
|---------------------------------|---|-----|-----|-----|--------|----|
| Total | 4 | 398 | 295 | 431 | 14,000 | 35 |
| Lake Superior | | | | | | |
| Lakes Huron and St. Clair | | | | | | |
| Lake Michigan | | | | | | |
| Lake Erie | 4 | 398 | 295 | 431 | 14,000 | 35 |
| Lake Ontario | | | | | | |
| St. Lawrence river | | | | | | |

SAND BOATS.

| | | | | | | |
|---------------------------------|---|----|----|-----|-------|----|
| Total | 1 | 81 | 71 | 102 | 5,000 | 62 |
| Lake Superior | | | | | | |
| Lakes Huron and St. Clair | | | | | | |
| Lake Michigan | | | | | | |
| Lake Erie | 1 | 81 | 71 | 102 | 5,000 | 62 |
| Lake Ontario | | | | | | |
| St. Lawrence river | | | | | | |

FIRE BOATS.

| | | | | | | |
|---------------------------------|---|-----|-----|-----|---------|-----|
| Total | 7 | 631 | 319 | 354 | 195,000 | 309 |
| Lake Superior | | | | | | |
| Lakes Huron and St. Clair | | | | | | |
| Lake Michigan | 5 | 432 | 219 | 240 | 135,000 | 313 |
| Lake Erie | 2 | 199 | 100 | 114 | 60,000 | 302 |
| Lake Ontario | | | | | | |
| St. Lawrence river | | | | | | |

STEAM LIGHTERS.

| | | | | | | |
|---------------------------------|---|-----|-----|-----|--------|----|
| Total | 4 | 302 | 368 | 339 | 14,000 | 36 |
| Lake Superior | | | | | | |
| Lakes Huron and St. Clair | | | | | | |
| Lake Michigan | | | | | | |
| Lake Erie | 4 | 302 | 368 | 339 | 14,000 | 36 |
| Lake Ontario | | | | | | |
| St. Lawrence river | | | | | | |

UNCLASSIFIED STEAM VESSELS.

| | | | | | | |
|---------------------------------|----|-------|-------|-------|---------|-----|
| Total | 55 | 2,646 | 1,913 | 1,895 | 210,000 | 79 |
| Lake Superior | 5 | 90 | 50 | 26 | 7,500 | 83 |
| Lakes Huron and St. Clair | 6 | 94 | 50 | 27 | 11,500 | 122 |
| Lake Michigan | 27 | 1,860 | 1,394 | 1,569 | 140,000 | 75 |
| Lake Erie | 9 | 313 | 229 | 176 | 30,500 | 97 |
| Lake Ontario | 5 | 160 | 107 | 55 | 8,500 | 53 |
| St. Lawrence river | 3 | 129 | 83 | 42 | 12,000 | 93 |

SCHOONERS.

| | | | | | | |
|---------------------------------|-----|---------|---------|---------|-----------|----|
| Total | 917 | 184,029 | 174,869 | 334,360 | 4,217,200 | 23 |
| Lake Superior | 31 | 2,784 | 2,669 | 5,143 | 74,200 | 27 |
| Lakes Huron and St. Clair | 203 | 33,639 | 31,336 | 61,962 | 805,500 | 24 |
| Lake Michigan | 488 | 76,442 | 72,630 | 138,463 | 1,481,500 | 19 |
| Lake Erie | 148 | 61,014 | 58,099 | 110,486 | 1,645,200 | 27 |
| Lake Ontario | 45 | 9,726 | 9,232 | 17,521 | 202,300 | 21 |
| St. Lawrence river | 2 | 424 | 403 | 785 | 8,500 | 20 |

EQUIPMENT, OCCUPATION, AND CONSTRUCTION—Continued.

TABLE 4.—OCCUPATION BY CLASS GROUPS—Continued.

LAKE BARGES.

| LAKES AND RIVER. | Number. | Gross tonnage. | Net tonnage. | Estimated carrying capacity (tons). | Commercial valuation. | Valuation per gross ton. |
|---------------------------------|---------|----------------|--------------|-------------------------------------|-----------------------|--------------------------|
| Total | 301 | 138,464 | 131,407 | 249,847 | \$3,463,500 | \$25 |
| Lake Superior | 10 | 7,612 | 7,388 | 14,103 | 345,000 | 45 |
| Lakes Huron and St. Clair | 171 | 75,849 | 71,787 | 136,534 | 1,772,500 | 23 |
| Lake Michigan | 46 | 17,353 | 16,534 | 31,397 | 394,500 | 23 |
| Lake Erie | 67 | 35,772 | 33,950 | 64,464 | 933,000 | 26 |
| Lake Ontario | 1 | 326 | 310 | 589 | 4,500 | 14 |
| St. Lawrence river | 6 | 1,492 | 1,438 | 2,760 | 14,000 | 9 |

SCOWS.

| | | | | | | |
|---------------------------------|---|-----|-----|-------|-------|----|
| Total | 7 | 996 | 952 | 1,833 | 9,000 | 9 |
| Lake Superior | | | | | | |
| Lakes Huron and St. Clair | 2 | 402 | 382 | 732 | 1,500 | 4 |
| Lake Michigan | 4 | 486 | 467 | 906 | 7,000 | 14 |
| Lake Erie | | | | | | |
| Lake Ontario | 1 | 108 | 103 | 195 | 500 | 5 |
| St. Lawrence river | | | | | | |

SLOOPS.

| | | | | | | |
|---------------------------------|----|-------|-----|-------|--------|----|
| Total | 44 | 1,035 | 986 | 1,943 | 21,350 | 21 |
| Lake Superior | | | | | | |
| Lakes Huron and St. Clair | 10 | 480 | 455 | 898 | 6,550 | 14 |
| Lake Michigan | 12 | 135 | 131 | 335 | 3,800 | 28 |
| Lake Erie | 2 | 60 | 62 | 118 | 2,200 | 33 |
| Lake Ontario | 18 | 292 | 276 | 595 | 8,300 | 28 |
| St. Lawrence river | 2 | 62 | 62 | 117 | 500 | 8 |

YAWLS.

| | | | | | | |
|---------------------------------|---|----|----|----|-----|----|
| Total | 1 | 17 | 17 | 32 | 300 | 18 |
| Lake Superior | | | | | | |
| Lakes Huron and St. Clair | | | | | | |
| Lake Michigan | | | | | | |
| Lake Erie | 1 | 17 | 17 | 32 | 300 | 18 |
| Lake Ontario | | | | | | |
| St. Lawrence river | | | | | | |

STATISTICS OF TRANSPORTATION.

EQUIPMENT, OCCUPATION, AND CONSTRUCTION—Continued.

TABLE 5.—CONSTRUCTION BY LOCALITIES—MATERIAL, NUMBER, TONNAGE, VALUE, AND AVERAGES OF VALUE AND TONNAGE OF ALL THE LAKE FLEET ENTERED FOR EACH PORT, WITH TOTALS FOR EACH LAKE AND ST. LAWRENCE RIVER.

| PORTS. | Material. | Number. | Gross Tonnage. | Valuation. | Average valuation per ton. | Average tonnage. |
|---------------------------------|-----------------|---------|----------------|--------------|----------------------------|------------------|
| Total | | 2,737 | 920,294 | \$48,580,174 | \$53 | 336 |
| Lake Superior | | 167 | 39,653 | 2,763,500 | 70 | 237 |
| Ashland | Wood | 1 | 73 | 5,000 | 68 | 73 |
| Baraga | do | 3 | 1,319 | 44,000 | 33 | 440 |
| Bayfield | do | 1 | 291 | 6,000 | 21 | 291 |
| Duluth | Steel | 3 | 2,684 | 175,000 | 65 | 895 |
| Do | Iron | 2 | 98 | 20,000 | 204 | 49 |
| Do | Composite | 1 | 37 | 8,000 | 216 | 37 |
| Do | Wood | 33 | 1,567 | 195,300 | 86 | 47 |
| Marquette | Steel | 4 | 9,904 | 900,000 | 91 | 2,476 |
| Do | Wood | 107 | 10,855 | 632,200 | 58 | 101 |
| Pequaming | do | 4 | 2,082 | 124,000 | 60 | 521 |
| Republic | do | 4 | 5,314 | 250,000 | 45 | 1,320 |
| Sault Ste. Marie | do | 2 | 477 | 25,000 | 52 | 239 |
| Superior | Steel | 2 | 4,952 | 450,000 | 91 | 2,476 |
| Lakes Huron and St. Clair | | 726 | 262,833 | 13,107,650 | 50 | 362 |
| Algonac | Wood | 6 | 2,345 | 46,000 | 20 | 301 |
| Alpena | Steel | 1 | 1,117 | 100,000 | 90 | 1,117 |
| Do | Wood | 8 | 3,867 | 66,400 | 17 | 483 |
| Bay city | Iron | 1 | 306 | 25,000 | 82 | 306 |
| Do | Wood | 55 | 30,870 | 1,121,100 | 36 | 561 |
| Caseville | do | 1 | 298 | 4,000 | 13 | 798 |
| Cheboygan | do | 2 | 83 | 7,500 | 90 | 42 |
| Detroit | Steel | 3 | 5,354 | 805,000 | 150 | 1,785 |
| Do | Iron | 7 | 6,096 | 706,000 | 116 | 870 |
| Do | Composite | 7 | 13,175 | 1,100,000 | 83 | 1,882 |
| Do | Wood | 258 | 105,149 | 4,936,800 | 47 | 408 |
| East China | do | 2 | 1,449 | 67,000 | 46 | 725 |
| East Saginaw | do | 30 | 13,261 | 419,600 | 32 | 442 |
| Marine | do | 23 | 9,875 | 230,800 | 23 | 429 |
| Mount Clemens | do | 2 | 504 | 1,500 | 3 | 252 |
| New Baltimore | do | 2 | 147 | 11,000 | 75 | 74 |
| Oscoda | do | 3 | 1,289 | 17,000 | 13 | 430 |
| Port Huron | Iron | 1 | 161 | 12,000 | 75 | 161 |
| Do | Composite | 1 | 58 | 15,000 | 259 | 58 |
| Do | Wood | 291 | 61,263 | 3,226,950 | 53 | 211 |
| Saginaw | do | 10 | 2,829 | 88,500 | 31 | 283 |
| St. Clair | do | 12 | 3,343 | 100,500 | 30 | 279 |
| Lake Michigan | | 1,003 | 196,216 | 9,114,400 | 46 | 196 |
| Benton Harbor | Wood | 3 | 699 | 39,500 | 57 | 233 |
| Charlevoix | do | 6 | 488 | 12,800 | 26 | 81 |
| Chicago | Steel | 2 | 3,481 | 335,000 | 96 | 1,741 |
| Do | Iron | 2 | 365 | 30,000 | 82 | 183 |
| Do | Wood | 335 | 67,414 | 2,723,350 | 40 | 201 |
| Escanaba | do | 5 | 1,615 | 52,000 | 32 | 323 |
| Port Howard | do | 2 | 222 | 5,500 | 25 | 111 |
| Frankfort | do | 1 | 7 | 1,000 | 143 | 7 |
| Grand Haven | Steel | 1 | 45 | 7,000 | 156 | 45 |
| Do | Iron | 5 | 2,534 | 321,000 | 127 | 507 |
| Do | Wood | 219 | 19,729 | 1,280,650 | 65 | 90 |
| Green Bay | do | 10 | 3,300 | 115,000 | 35 | 330 |
| Holland | do | 2 | 220 | 3,000 | 14 | 110 |
| Kenosha | do | 19 | 7,378 | 353,000 | 49 | 388 |
| Kewaunee | do | 1 | 160 | 3,000 | 19 | 160 |
| Ludington | do | 4 | 752 | 12,000 | 16 | 188 |
| Manistee | do | 11 | 2,732 | 54,000 | 20 | 248 |
| Manitowoc | do | 15 | 1,775 | 34,600 | 19 | 118 |
| Menominee | do | 1 | 277 | 2,500 | 9 | 277 |
| Milwaukee | Iron | 3 | 1,070 | 82,000 | 77 | 357 |
| Do | Wood | 256 | 60,624 | 3,123,000 | 52 | 237 |
| Montagne | do | 2 | 217 | 4,000 | 18 | 109 |
| Muskegon | do | 17 | 3,088 | 63,100 | 20 | 182 |
| Northport | do | 1 | 63 | 7,000 | 111 | 63 |
| Onkama | do | 1 | 146 | 3,500 | 24 | 146 |
| Pentwater | do | 2 | 260 | 4,500 | 17 | 130 |
| Peshigo | do | 3 | 1,704 | 52,500 | 31 | 508 |
| Petoskey | do | 1 | 123 | 12,000 | 98 | 123 |
| Racine | do | 20 | 6,932 | 145,400 | 21 | 267 |
| St. James | do | 1 | 81 | 1,500 | 10 | 81 |
| St. Joseph | do | 2 | 164 | 1,000 | 6 | 82 |
| Saugatuck | do | 3 | 647 | 33,500 | 52 | 216 |
| Sheboygan | do | 25 | 4,115 | 79,900 | 19 | 165 |
| South Haven | do | 4 | 374 | 5,100 | 14 | 94 |

EQUIPMENT, OCCUPATION, AND CONSTRUCTION—Continued.

TABLE 5.—CONSTRUCTION BY LOCALITIES—Continued.

| PORTS. | Material. | Number. | Gross tonnage. | Valuation. | Average valuation per ton. | Average tonnage. |
|--------------------------|-----------------|---------|----------------|------------|----------------------------|------------------|
| Lake Michigan—Continued. | | | | | | |
| Spring Lake | Wood | 2 | 345 | \$8,000 | \$23 | 172 |
| Sturgeon Bay | do | 2 | 550 | 5,000 | 9 | 275 |
| Suttons Bay | do | 1 | 232 | 3,000 | 13 | 232 |
| Traverse | do | 1 | 336 | 20,000 | 60 | 336 |
| Troy | do | 1 | 301 | 7,000 | 23 | 301 |
| Waukegan | do | 2 | 1,296 | 58,000 | 45 | 648 |
| Waukesha | do | 1 | 48 | 600 | 13 | 48 |
| Whitehall | do | 2 | 307 | 4,000 | 13 | 154 |
| Lake Erie | | 667 | 392,903 | 22,163,824 | 56 | 589 |
| Ashtabula | Wood | 4 | 175 | 27,000 | 154 | 44 |
| Avon | do | 1 | 264 | 5,000 | 19 | 264 |
| Buffalo | Steel | 14 | 29,853 | 2,950,000 | 99 | 2,132 |
| Do | Iron | 12 | 8,779 | 753,224 | 86 | 732 |
| Do | Composite | 1 | 1,399 | 90,000 | 64 | 1,399 |
| Do | Wood | 177 | 88,829 | 4,441,900 | 50 | 502 |
| Cleveland | Steel | 8 | 13,539 | 1,252,000 | 90 | 1,730 |
| Do | Iron | 9 | 6,147 | 515,000 | 84 | 2,049 |
| Do | Wood | 208 | 143,241 | 7,035,800 | 49 | 689 |
| Dunkirk | do | 3 | 522 | 20,000 | 56 | 174 |
| Erie | Steel | 1 | 2,500 | 225,000 | 90 | 2,500 |
| Do | Iron | 7 | 9,886 | 711,000 | 72 | 1,412 |
| Do | Wood | 29 | 17,068 | 823,900 | 48 | 589 |
| Fairport | do | 5 | 316 | 17,000 | 54 | 63 |
| Fremont | do | 2 | 20 | 1,800 | 90 | 10 |
| Gratwick | do | 1 | 538 | 28,000 | 52 | 538 |
| Huron | do | 12 | 5,091 | 274,700 | 54 | 424 |
| Lorain | Steel | 1 | 1,759 | 150,000 | 85 | 1,759 |
| Do | Wood | 17 | 6,862 | 171,500 | 25 | 404 |
| Milan | do | 0 | 6,824 | 323,500 | 47 | 1,137 |
| Norwalk | do | 2 | 1,344 | 51,000 | 38 | 672 |
| Port Clinton | do | 1 | 56 | 5,000 | 89 | 56 |
| Put in Bay | do | 1 | 168 | 6,000 | 36 | 168 |
| Suspension Bridge | do | 3 | 346 | 19,000 | 55 | 115 |
| Sandusky | do | 64 | 18,303 | 865,200 | 47 | 286 |
| Toledo | Iron | 1 | 173 | 17,000 | 98 | 173 |
| Do | Wood | 58 | 17,854 | 890,300 | 50 | 308 |
| Tonawanda | do | 19 | 5,696 | 287,000 | 50 | 300 |
| Vermilion | do | 6 | 5,051 | 198,000 | 39 | 842 |
| Lake Ontario | | 131 | 15,859 | 676,300 | 43 | 121 |
| Cape Vincent | Wood | 52 | 2,220 | 126,500 | 57 | 43 |
| Charlotte | Wood | 1 | 309 | 6,000 | 19 | 309 |
| Chaumont | do | 1 | 175 | 3,000 | 17 | 175 |
| Hamlin | do | 1 | 246 | 4,000 | 16 | 246 |
| Henderson | do | 1 | 9 | 2,000 | 222 | 9 |
| Medina | do | 42 | 8,842 | 402,000 | 45 | 211 |
| Oswego | do | 1 | 80 | 1,500 | 19 | 80 |
| Pultneyville | do | 1 | 87 | 15,000 | 172 | 87 |
| Rochester | Composite | 20 | 2,189 | 75,900 | 35 | 109 |
| Do | Wood | 5 | 521 | 7,700 | 15 | 104 |
| Sacketts Harbor | do | 2 | 296 | 8,000 | 27 | 148 |
| Sodus Point | do | 1 | 555 | 18,000 | 32 | 555 |
| Troy | do | 2 | 280 | 5,000 | 18 | 140 |
| Wilson | do | 1 | 50 | 1,700 | 34 | 50 |
| Youngstown | do | 1 | 50 | 1,700 | 34 | 50 |
| St. Lawrence river | | 43 | 12,830 | 754,500 | 59 | 298 |
| Alexandria Bay | Wood | 3 | 37 | 5,000 | 135 | 12 |
| Clayton | Iron | 1 | 313 | 33,000 | 105 | 313 |
| Do | Wood | 6 | 1,015 | 36,500 | 36 | 160 |
| Ogdensburg | do | 33 | 11,465 | 680,000 | 59 | 347 |

EQUIPMENT, OCCUPATION, AND CONSTRUCTION—Continued.

TABLE 6.—CONSTRUCTION BY MATERIALS—MATERIAL, NUMBER, TONNAGE, VALUE, AND AVERAGES OF VALUE AND TONNAGE OF ALL THE LAKE FLEET ENTERED BY EACH PORT, BUT GROUPED TO SHOW THE TOTALS FOR EACH MATERIAL OF CONSTRUCTION.

| STEEL. | | | | | | WOOD. | | | | | |
|------------------------------|---------|----------|-------------|----------------------------|------------------|--------------------------------|---------|----------|--------------|----------------------------|------------------|
| PORTS. | Number. | Tonnage. | Valuation. | Average valuation per ton. | Average tonnage. | PORTS. | Number. | Tonnage. | Valuation. | Average valuation per ton. | Average tonnage. |
| Total | 40 | 75,488 | \$7,349,000 | \$97 | 1,887 | Total | 2,641 | 794,128 | \$36,777,950 | \$46 | 301 |
| Lake Superior | 9 | 17,540 | 1,525,000 | 87 | 1,040 | Lake Superior | 155 | 21,978 | 1,210,500 | 55 | 142 |
| Duluth | 3 | 2,684 | 175,000 | 65 | 895 | Ashland | 1 | 73 | 5,000 | 68 | 73 |
| Marquette | 4 | 9,904 | 900,000 | 91 | 2,476 | Baraga | 3 | 1,819 | 44,000 | 33 | 440 |
| Superior | 2 | 4,952 | 450,000 | 91 | 2,476 | Bayfield | 1 | 291 | 6,000 | 21 | 291 |
| Lakes Huron and St. Clair .. | 4 | 6,471 | 905,000 | 140 | 1,618 | Duluth | 33 | 1,567 | 135,300 | 86 | 47 |
| Alpena | 1 | 1,117 | 100,000 | 90 | 1,117 | Marquette | 107 | 10,855 | 632,200 | 58 | 101 |
| Detroit | 3 | 5,354 | 805,000 | 150 | 1,785 | Piquette | 4 | 2,082 | 124,000 | 60 | 521 |
| Lake Michigan | 3 | 3,526 | 342,000 | 97 | 1,175 | Republic | 4 | 5,314 | 239,000 | 45 | 1,329 |
| Chicago | 2 | 3,481 | 335,000 | 96 | 1,741 | Sault Ste. Marie | 2 | 477 | 25,000 | 52 | 239 |
| Grand Haven | 1 | 45 | 7,000 | 150 | 45 | Lakes Huron and St. Clair .. | 705 | 236,572 | 10,344,650 | 44 | 336 |
| Lake Erie | 24 | 47,951 | 4,577,000 | 95 | 1,998 | Algonac | 6 | 2,345 | 46,000 | 20 | 391 |
| Buffalo | 14 | 29,853 | 2,950,000 | 90 | 2,132 | Alpena | 8 | 3,867 | 66,400 | 17 | 483 |
| Cleveland | 8 | 13,839 | 1,252,000 | 90 | 1,730 | Bay city | 55 | 30,870 | 1,121,100 | 36 | 561 |
| Erie | 1 | 2,500 | 225,000 | 90 | 2,500 | Cassville | 1 | 298 | 4,000 | 13 | 298 |
| Lorain | 1 | 1,759 | 150,000 | 85 | 1,759 | Cheboygan | 2 | 83 | 7,500 | 90 | 42 |
| IRON. | | | | | | Detroit | 258 | 105,149 | 4,936,800 | 47 | 408 |
| Total | 45 | 35,922 | 3,225,224 | 90 | 798 | East China | 2 | 1,449 | 67,000 | 46 | 725 |
| Lake Superior | 2 | 98 | 20,000 | 204 | 49 | East Saginaw | 30 | 13,261 | 419,600 | 32 | 442 |
| Duluth | 2 | 98 | 20,000 | 204 | 49 | Marine | 23 | 9,875 | 230,800 | 23 | 420 |
| Lakes Huron and St. Clair .. | 9 | 6,557 | 743,000 | 113 | 729 | Mount Clemens | 2 | 504 | 1,500 | 3 | 252 |
| Bay city | 1 | 306 | 25,000 | 82 | 306 | New Baltimore | 2 | 147 | 11,000 | 75 | 74 |
| Detroit | 7 | 6,090 | 706,000 | 116 | 870 | Oscoda | 3 | 1,289 | 17,000 | 13 | 430 |
| Port Huron | 1 | 161 | 12,000 | 75 | 161 | Port Huron | 291 | 61,263 | 3,226,950 | 53 | 211 |
| Lake Michigan | 10 | 3,960 | 433,000 | 109 | 397 | Saginaw | 10 | 2,829 | 88,500 | 31 | 283 |
| Chicago | 2 | 365 | 30,000 | 82 | 183 | St. Clair | 12 | 3,343 | 100,500 | 30 | 279 |
| Grand Haven | 5 | 2,534 | 321,000 | 127 | 507 | Lake Michigan | 990 | 188,721 | 8,339,400 | 44 | 190 |
| Milwaukee | 3 | 1,070 | 82,000 | 77 | 357 | Benton Harbor | 3 | 699 | 39,500 | 57 | 233 |
| Lake Erie | 23 | 24,985 | 1,996,224 | 80 | 1,086 | Charlevoix | 6 | 488 | 12,800 | 26 | 81 |
| Buffalo | 12 | 8,779 | 753,224 | 80 | 732 | Chicago | 335 | 67,414 | 2,723,350 | 40 | 201 |
| Cleveland | 3 | 6,147 | 515,000 | 84 | 2,049 | Escanaba | 5 | 1,615 | 52,000 | 32 | 323 |
| Erie | 7 | 9,886 | 711,000 | 72 | 1,412 | Fort Howard | 2 | 222 | 5,500 | 25 | 111 |
| Toledo | 1 | 173 | 17,000 | 98 | 173 | Frankfort | 1 | 7 | 1,000 | 143 | 7 |
| St. Lawrence river | 1 | 313 | 33,000 | 105 | 313 | Grand Haven | 219 | 10,729 | 1,280,650 | 65 | 90 |
| Clayton | 1 | 313 | 33,000 | 105 | 313 | Green Bay | 10 | 3,300 | 115,000 | 35 | 330 |
| COMPOSITE. | | | | | | Holland | 2 | 220 | 3,000 | 14 | 110 |
| Total | 11 | 14,756 | 1,228,000 | 83 | 1,341 | Kenosha | 19 | 7,378 | 358,900 | 49 | 388 |
| Lake Superior | 1 | 37 | 8,000 | 216 | 37 | Kewaunee | 1 | 160 | 3,000 | 19 | 160 |
| Duluth | 1 | 37 | 8,000 | 216 | 37 | Ludington | 4 | 752 | 12,000 | 16 | 188 |
| Lakes Huron and St. Clair .. | 8 | 13,233 | 1,115,000 | 84 | 1,654 | Manistee | 11 | 2,732 | 54,000 | 20 | 248 |
| Detroit | 7 | 13,175 | 1,100,000 | 83 | 1,882 | Manitowoc | 15 | 1,775 | 34,600 | 19 | 118 |
| Port Huron | 1 | 58 | 15,000 | 259 | 58 | Menominee | 1 | 277 | 2,500 | 9 | 277 |
| Lake Erie | 1 | 1,399 | 90,000 | 64 | 1,399 | Milwaukee | 256 | 60,624 | 3,123,000 | 52 | 237 |
| Buffalo | 1 | 1,399 | 90,000 | 64 | 1,399 | Montague | 2 | 217 | 4,000 | 18 | 109 |
| Lake Ontario | 1 | 87 | 15,000 | 172 | 87 | Muskegon | 17 | 3,088 | 63,100 | 20 | 182 |
| Rochester | 1 | 87 | 15,000 | 172 | 87 | Northport | 1 | 63 | 7,000 | 111 | 63 |
| | | | | | | Onkama | 1 | 146 | 3,500 | 24 | 146 |
| | | | | | | Pentwater | 2 | 200 | 4,500 | 17 | 130 |
| | | | | | | Peshigo | 3 | 1,704 | 52,500 | 31 | 568 |
| | | | | | | Petoskey | 1 | 123 | 12,000 | 98 | 123 |
| | | | | | | Racine | 26 | 6,932 | 145,400 | 21 | 207 |
| | | | | | | St. James | 1 | 81 | 1,500 | 19 | 81 |
| | | | | | | St. Joseph | 2 | 164 | 1,000 | 6 | 82 |
| | | | | | | Saugatuck | 3 | 647 | 33,500 | 52 | 216 |
| | | | | | | Sheboygan | 25 | 4,115 | 79,900 | 19 | 165 |
| | | | | | | South Haven | 4 | 374 | 5,100 | 14 | 94 |
| | | | | | | Spring Lake | 2 | 345 | 8,000 | 23 | 172 |
| | | | | | | Sturgeon Bay | 2 | 550 | 5,000 | 9 | 275 |
| | | | | | | Suttons Bay | 1 | 232 | 3,000 | 13 | 232 |
| | | | | | | Traverse | 1 | 336 | 20,000 | 60 | 336 |
| | | | | | | Troy | 1 | 301 | 7,000 | 23 | 301 |
| | | | | | | Waukegan | 2 | 1,296 | 58,000 | 45 | 648 |
| | | | | | | Waukesha | 1 | 48 | 600 | 13 | 48 |
| | | | | | | Whitehall | 2 | 307 | 4,000 | 13 | 154 |
| | | | | | | Lake Erie and Niagara river .. | 619 | 318,568 | 15,500,600 | 49 | 515 |
| | | | | | | Ashtabula | 4 | 175 | 27,000 | 154 | 44 |
| | | | | | | Avon | 1 | 264 | 5,000 | 19 | 264 |
| | | | | | | Buffalo | 177 | 88,829 | 4,441,900 | 50 | 502 |
| | | | | | | Cleveland | 208 | 143,241 | 7,035,800 | 49 | 680 |
| | | | | | | Dunkirk | 3 | 522 | 29,000 | 56 | 174 |
| | | | | | | Erie | 29 | 17,068 | 823,900 | 48 | 589 |
| | | | | | | Fairport | 5 | 310 | 17,000 | 54 | 63 |
| | | | | | | Fremont | 2 | 20 | 1,800 | 90 | 10 |
| | | | | | | Gratwick | 1 | 538 | 28,000 | 52 | 538 |
| | | | | | | Huron | 12 | 5,091 | 274,700 | 54 | 424 |
| | | | | | | Lorain | 17 | 6,862 | 171,500 | 25 | 404 |
| | | | | | | Milan | 6 | 6,824 | 323,500 | 47 | 1,137 |
| | | | | | | Norwalk | 2 | 1,344 | 51,000 | 38 | 672 |

EQUIPMENT, OCCUPATION, AND CONSTRUCTION—Continued.

TABLE 6.—CONSTRUCTION BY MATERIALS—Continued.

| WOOD—Continued. | | | | | | WOOD—Continued. | | | | | |
|--|---------|----------|------------|----------------------------|------------------|-------------------------------|---------|----------|------------|----------------------------|------------------|
| PORTS. | Number. | Tonnage. | Valuation. | Average valuation per ton. | Average tonnage. | PORTS. | Number. | Tonnage. | Valuation. | Average valuation per ton. | Average tonnage. |
| Lake Erie and Niagara river—Continued. | | | | | | Lake Ontario—Continued. | | | | | |
| Port Clinton..... | 1 | 56 | \$5,000 | \$80 | 56 | Sodus Point..... | 2 | 296 | \$8,000 | \$27 | 148 |
| Put in Bay..... | 1 | 168 | 6,000 | 36 | 168 | Troy..... | 1 | 555 | 18,000 | 32 | 555 |
| Suspension Bridge..... | 3 | 346 | 19,000 | 55 | 115 | Wilson..... | 2 | 280 | 5,000 | 18 | 140 |
| Sandusky..... | 64 | 18,303 | 865,200 | 47 | 286 | Youngstown..... | 1 | 50 | 1,700 | 34 | 50 |
| Toledo..... | 58 | 17,854 | 890,300 | 50 | 308 | St. Lawrence river..... | 42 | 12,517 | 721,500 | 58 | 298 |
| Tonawanda..... | 19 | 5,696 | 287,000 | 50 | 300 | Alexandria Bay..... | 3 | 37 | 5,000 | 135 | 12 |
| Vermilion..... | 0 | 5,051 | 198,000 | 39 | 842 | Clayton..... | 6 | 1,015 | 30,500 | 36 | 169 |
| Lake Ontario..... | 130 | 15,772 | 661,300 | 42 | 121 | Ogdensburg..... | 33 | 11,465 | 680,000 | 59 | 347 |
| Cape Vincent..... | 52 | 2,220 | 126,500 | 57 | 43 | RECAPITULATION—ALL MATERIALS. | | | | | |
| Charlotte..... | 1 | 309 | 6,000 | 19 | 309 | Total..... | 2,737 | 920,294 | 48,580,174 | 53 | 336 |
| Chamont..... | 1 | 175 | 3,000 | 17 | 175 | Steel..... | 40 | 75,488 | 7,349,000 | 97 | 1,887 |
| Hamlin..... | 1 | 246 | 4,000 | 16 | 246 | Iron..... | 45 | 35,922 | 3,225,224 | 90 | 798 |
| Henderson..... | 1 | | | | | Composite..... | 11 | 14,750 | 1,228,000 | 83 | 1,341 |
| Medina..... | 1 | 9 | 2,000 | 222 | 9 | Wood..... | 2,641 | 794,128 | 30,777,950 | 46 | 301 |
| Oswego..... | 42 | 8,842 | 402,000 | 45 | 211 | | | | | | |
| Pultneyville..... | 1 | 80 | 1,500 | 19 | 80 | | | | | | |
| Rochester..... | 20 | 2,189 | 75,900 | 35 | 109 | | | | | | |
| Sacketts Harbor..... | 5 | 521 | 7,700 | 15 | 104 | | | | | | |

STATISTICS OF TRANSPORTATION.

TRAFFIC OPERATIONS.

TABLE 7.—FREIGHT MOVEMENT IN GENERAL—RECEIPTS, SHIPMENTS, AND TOTAL MOVEMENT OF FREIGHT BY LAKE AND RIVER TOTALS, CLASSED BY PRINCIPAL PRODUCTS, TOGETHER WITH CERTAIN PERCENTAGES OF TRAFFIC APPLIED TO LOCALITIES AND COMMODITIES.

SUMMARY FOR ALL LAKES AND ST. LAWRENCE RIVER.

| COMMODITIES. | TOTAL MOVEMENT. | | | RECEIPTS. | | | SHIPMENTS. | | | EXCESS OF RECEIPTS OVER SHIPMENTS. | | | | EXCESS OF SHIPMENTS OVER RECEIPTS. | | |
|---|-----------------|----------------------------|------------------------------|-----------------|----------------------------|------------------------------|-----------------|----------------------------|------------------------------|------------------------------------|------------------------|--------------------|------------------------|------------------------------------|------------------------|--------------------|
| | Amount in tons. | Per cent of total traffic. | Per cent of total commodity. | Amount in tons. | Per cent of total traffic. | Per cent of total commodity. | Amount in tons. | Per cent of total traffic. | Per cent of total commodity. | Amount in tons. | Per cent of commodity. | Per cent of class. | Per cent of aggregate. | Amount in tons. | Per cent of commodity. | Per cent of class. |
| Total | 51,203,106 | 100.00 | 100 | 25,936,132 | 100.00 | 100 | 25,266,974 | 100.00 | 100 | 669,158 | | | 2.58 | | | |
| Class I.—Products of agriculture. | 8,449,806 | 16.50 | 100 | 4,041,738 | 15.58 | 100 | 4,408,068 | 17.45 | 100 | | | | | 366,330 | | 8.31 |
| Wheat | 1,888,312 | 3.69 | 100 | 919,162 | 3.54 | 100 | 969,150 | 3.84 | 100 | | | | | 49,988 | 5.16 | |
| Corn | 3,513,515 | 6.86 | 100 | 1,583,901 | 6.11 | 100 | 1,929,614 | 7.64 | 100 | | | | | 345,713 | 17.92 | |
| Other grains | 980,514 | 1.92 | 100 | 477,397 | 1.84 | 100 | 503,117 | 1.99 | 100 | | | | | 25,720 | 5.11 | |
| Mill products | 1,886,189 | 3.68 | 100 | 992,066 | 3.82 | 100 | 894,123 | 3.54 | 100 | 97,943 | 9.87 | | | | | |
| All other farm products. | 181,276 | 0.35 | 100 | 69,212 | 0.27 | 100 | 112,064 | 0.44 | 100 | | | | | 42,852 | 38.24 | |
| Class II.—Products of mines and quarries. | 27,763,175 | 54.22 | 100 | 13,454,189 | 51.88 | 100 | 14,308,989 | 56.63 | 100 | | | | | 854,800 | | 5.97 |
| Coal and coke | 11,268,273 | 22.00 | 100 | 5,162,471 | 19.91 | 100 | 6,105,799 | 24.17 | 100 | | | | | 943,328 | 15.45 | |
| Iron ore | 15,303,180 | 29.89 | 100 | 7,620,073 | 29.40 | 100 | 7,677,107 | 30.38 | 100 | | | | | 51,034 | 0.66 | |
| Stone (all kinds) | 547,229 | 1.07 | 100 | 311,015 | 1.20 | 100 | 236,214 | 0.93 | 100 | 74,801 | 24.05 | | | | | |
| Salt | 549,350 | 1.07 | 100 | 296,513 | 1.14 | 100 | 252,837 | 1.00 | 100 | 43,676 | 14.72 | | | | | |
| Other products of mines and quarries. | 95,149 | 0.19 | 100 | 58,117 | 0.23 | 100 | 37,032 | 0.15 | 100 | 21,085 | 36.28 | | | | | |
| Class III.—Other products. | 12,331,236 | 24.09 | 100 | 6,921,985 | 26.69 | 100 | 5,409,251 | 21.41 | 100 | 1,512,734 | | 21.85 | | | | |
| Animal products | 125,581 | 0.25 | 100 | 64,728 | 0.25 | 100 | 60,853 | 0.24 | 100 | 3,875 | 5.99 | | | | | |
| Lumber | 12,205,655 | 23.84 | 100 | 6,857,257 | 26.44 | 100 | 5,348,398 | 21.17 | 100 | 1,508,859 | 22.00 | | | | | |
| Class IV.—Manufactures, miscellaneous merchandise, and other commodities. | 2,658,886 | 5.19 | 100 | 1,518,220 | 5.85 | 100 | 1,140,666 | 4.51 | 100 | 377,554 | 24.87 | | | | | |

LAKE SUPERIOR.

| COMMODITIES. | TOTAL MOVEMENT. | | | RECEIPTS. | | | SHIPMENTS. | | |
|---|-----------------|---------------------------------|---|-----------------|---------------------------------|---|-----------------|---------------------------------|---|
| | Amount in tons. | Per cent of total lake traffic. | Per cent of total commodity traffic on the Great Lakes. | Amount in tons. | Per cent of total lake traffic. | Per cent of total commodity traffic on the Great Lakes. | Amount in tons. | Per cent of total lake traffic. | Per cent of total commodity traffic on the Great Lakes. |
| Total | 7,925,930 | 100.00 | 15.48 | 2,491,149 | 100.00 | 9.60 | 5,434,781 | 100.00 | 21.51 |
| Class I.—Products of agriculture | 603,930 | 8.38 | 7.86 | 1,886 | 0.08 | 0.05 | 662,044 | 12.18 | 15.02 |
| Wheat | 399,355 | 5.04 | 21.15 | | | | 399,355 | 7.35 | 41.21 |
| Corn | 55,134 | 0.70 | 1.57 | 22 | | | 55,112 | 1.01 | 2.86 |
| Other grains | 1,846 | 0.02 | 0.19 | 464 | 0.02 | 0.10 | 1,382 | 0.02 | 0.27 |
| Mill products | 205,720 | 2.60 | 10.91 | 493 | 0.02 | 0.05 | 205,227 | 3.78 | 22.95 |
| All other farm products | 1,875 | 0.02 | 1.03 | 907 | 0.04 | 1.31 | 968 | 0.02 | 0.86 |
| Class II.—Products of mines and quarries | 6,072,985 | 76.62 | 21.87 | 1,855,072 | 74.47 | 13.79 | 4,217,913 | 77.61 | 29.48 |
| Coal and coke | 1,780,750 | 22.47 | 15.80 | 1,754,075 | 70.44 | 33.99 | 26,075 | 0.48 | 0.43 |
| Iron ore | 4,151,743 | 52.38 | 27.13 | 10,091 | 0.43 | 0.14 | 4,141,057 | 76.20 | 53.94 |
| Stone (all kinds) | 87,276 | 1.10 | 15.95 | 69,587 | 2.79 | 22.37 | 17,689 | 0.32 | 7.49 |
| Salt | 20,142 | 0.25 | 3.07 | 20,119 | 0.81 | 6.78 | 23 | | 0.01 |
| Other products of mines and quarries. | 33,069 | 0.42 | 34.76 | | | | 33,069 | 0.61 | 89.30 |
| Class III.—Other products | 477,981 | 6.03 | 3.88 | 8,281 | 0.33 | 0.12 | 469,700 | 8.64 | 8.68 |
| Animal products | 1,914 | 0.02 | 1.52 | 371 | 0.01 | 0.57 | 1,543 | 0.03 | 2.53 |
| Lumber | 476,067 | 6.01 | 3.90 | 7,910 | 0.32 | 0.12 | 468,157 | 8.61 | 8.75 |
| Class IV.—Manufactures, miscellaneous merchandise, and other commodities. | 711,034 | 8.97 | 26.74 | 625,910 | 25.12 | 41.23 | 85,124 | 1.57 | 7.40 |

TRANSPORTATION ON THE GREAT LAKES.

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TRAFFIC OPERATIONS—Continued.

TABLE 7.—FREIGHT MOVEMENT IN GENERAL—Continued.

LAKES HURON AND ST. CLAIR.

| COMMODITIES. | TOTAL MOVEMENT. | | | RECEIPTS. | | | SHIPMENTS. | | |
|---|-----------------|---------------------------------|---|-----------------|---------------------------------|---|-----------------|---------------------------------|---|
| | Amount in tons. | Per cent of total lake traffic. | Per cent of total commodity traffic on the Great Lakes. | Amount in tons. | Per cent of total lake traffic. | Per cent of total commodity traffic on the Great Lakes. | Amount in tons. | Per cent of total lake traffic. | Per cent of total commodity traffic on the Great Lakes. |
| Total..... | 3,373,807 | 100.00 | 6.50 | 1,029,356 | 100.00 | 3.97 | 2,344,451 | 100.00 | 9.27 |
| Class I.—Products of agriculture..... | 195,619 | 5.80 | 2.31 | 68,553 | 6.66 | 1.69 | 127,066 | 5.42 | 2.88 |
| Wheat..... | 110,663 | 3.28 | 5.86 | 29,246 | 2.84 | 3.18 | 81,417 | 3.47 | 8.40 |
| Corn..... | 38,448 | 1.14 | 1.00 | 10,688 | 1.04 | 0.68 | 27,760 | 1.18 | 1.44 |
| Other grains..... | 22,479 | 0.67 | 2.29 | 16,275 | 1.58 | 3.41 | 6,204 | 0.27 | 1.23 |
| Mill products..... | 16,792 | 0.50 | 0.89 | 11,963 | 1.16 | 1.21 | 4,829 | 0.21 | 0.54 |
| All other farm products..... | 7,237 | 0.21 | 3.99 | 381 | 0.04 | 0.55 | 6,856 | 0.29 | 6.12 |
| Class II.—Products of mines and quarries..... | 665,583 | 19.73 | 2.40 | 532,175 | 51.70 | 3.95 | 133,408 | 5.69 | 0.93 |
| Coal and coke..... | 376,321 | 11.15 | 3.34 | 362,747 | 35.24 | 7.03 | 13,574 | 0.58 | 0.22 |
| Iron ore..... | 180,090 | 5.34 | 1.18 | 117,650 | 11.43 | 1.54 | 62,451 | 2.66 | 0.81 |
| Stone (all kinds)..... | 25,975 | 0.77 | 4.75 | 25,975 | 2.52 | 8.35 | ..... | ..... | ..... |
| Salt..... | 78,523 | 2.33 | 14.30 | 25,619 | 2.43 | 8.45 | 53,480 | 2.28 | 21.15 |
| Other products of mines and quarries..... | 4,674 | 0.14 | 4.91 | 771 | 0.08 | 1.33 | 3,903 | 0.17 | 10.54 |
| Class III.—Other products..... | 2,426,660 | 71.92 | 19.68 | 390,434 | 37.93 | 5.69 | 2,036,226 | 86.85 | 37.65 |
| Animal products..... | 175 | ..... | 0.14 | ..... | ..... | ..... | 175 | ..... | 0.29 |
| Lumber..... | 2,426,485 | 71.92 | 19.88 | 390,434 | 37.93 | 5.69 | 2,036,051 | 86.85 | 38.07 |
| Class IV.—Manufactures, miscellaneous merchandise, and other commodities..... | 85,945 | 2.55 | 3.23 | 38,194 | 3.71 | 2.52 | 47,751 | 2.04 | 4.19 |

LAKE MICHIGAN.

| | | | | | | | | | |
|---|------------|--------|-------|-----------|--------|-------|------------|--------|-------|
| Total..... | 18,571,258 | 100.00 | 36.27 | 8,480,892 | 100.00 | 32.70 | 10,090,366 | 100.00 | 39.94 |
| Class I.—Products of agriculture..... | 3,480,217 | 18.74 | 41.10 | 152,793 | 1.79 | 3.78 | 3,327,424 | 32.98 | 75.48 |
| Wheat..... | 352,019 | 1.89 | 18.64 | 4,553 | 0.05 | 0.50 | 347,466 | 3.44 | 35.85 |
| Corn..... | 1,778,318 | 9.58 | 50.61 | 6,209 | 0.07 | 0.39 | 1,772,109 | 17.56 | 91.84 |
| Other grains..... | 500,596 | 2.70 | 51.05 | 10,625 | 0.12 | 2.22 | 489,971 | 4.86 | 97.39 |
| Mill products..... | 738,833 | 3.98 | 39.17 | 118,423 | 1.40 | 11.94 | 620,410 | 6.15 | 69.39 |
| All other farm products..... | 110,451 | 0.59 | 60.93 | 12,983 | 0.15 | 18.76 | 97,468 | 0.97 | 86.98 |
| Class II.—Products of mines and quarries..... | 7,784,066 | 41.91 | 28.04 | 4,151,379 | 48.95 | 30.85 | 3,632,687 | 35.99 | 25.39 |
| Coal and coke..... | 2,865,278 | 15.43 | 25.43 | 2,865,021 | 33.78 | 55.50 | 257 | ..... | ..... |
| Iron ore..... | 4,451,577 | 23.97 | 20.09 | 1,004,630 | 11.85 | 13.17 | 3,446,947 | 34.16 | 44.90 |
| Stone (all kinds)..... | 63,410 | 0.34 | 11.59 | 51,944 | 0.61 | 16.70 | 11,466 | 0.11 | 4.86 |
| Salt..... | 399,539 | 2.15 | 72.73 | 225,582 | 2.66 | 76.08 | 173,957 | 1.72 | 08.80 |
| Other products of mines and quarries..... | 4,262 | 0.02 | 4.48 | 4,262 | 0.05 | 7.23 | 60 | ..... | 0.16 |
| Class III.—Other products..... | 6,447,442 | 34.72 | 52.28 | 3,552,071 | 41.89 | 51.32 | 2,895,371 | 28.70 | 53.53 |
| Animal products..... | 62,283 | 0.34 | 49.60 | 3,148 | 0.04 | 4.86 | 59,135 | 0.59 | 97.18 |
| Lumber..... | 6,385,159 | 34.38 | 52.31 | 3,548,923 | 41.85 | 51.75 | 2,836,236 | 28.11 | 53.03 |
| Class IV.—Manufactures, miscellaneous merchandise, and other commodities..... | 859,533 | 4.63 | 32.33 | 624,640 | 7.37 | 41.14 | 234,884 | 2.33 | 20.59 |

STATISTICS OF TRANSPORTATION.

TRAFFIC OPERATIONS—Continued.

TABLE 7.—FREIGHT MOVEMENT IN GENERAL—Continued.

LAKE ERIE.

| COMMODITIES. | TOTAL MOVEMENT. | | | RECEIPTS. | | | SHIPMENTS. | | |
|---|-----------------|---------------------------------|---|-----------------|---------------------------------|---|-----------------|---------------------------------|---|
| | Amount in tons. | Per cent of total lake traffic. | Per cent of total commodity traffic on the Great Lakes. | Amount in tons. | Per cent of total lake traffic. | Per cent of total commodity traffic on the Great Lakes. | Amount in tons. | Per cent of total lake traffic. | Per cent of total commodity traffic on the Great Lakes. |
| Total | 19,343,875 | 100.00 | 37.78 | 12,957,483 | 100.00 | 49.96 | 6,386,392 | 100.00 | 25.28 |
| Class I.—Products of agriculture..... | 3,735,845 | 19.31 | 44.21 | 3,450,723 | 26.63 | 85.38 | 285,122 | 4.46 | 6.47 |
| Wheat | 978,733 | 5.06 | 51.83 | 837,821 | 6.47 | 91.15 | 140,912 | 2.20 | 14.54 |
| Corn | 1,493,145 | 7.72 | 42.50 | 1,418,017 | 10.95 | 89.56 | 74,528 | 1.17 | 3.86 |
| Other grains | 336,684 | 1.74 | 34.34 | 351,124 | 2.55 | 99.36 | 5,560 | 0.09 | 1.11 |
| Mill products..... | 878,067 | 4.54 | 46.55 | 814,410 | 6.28 | 82.09 | 63,657 | 1.00 | 7.12 |
| All other farm products..... | 49,216 | 0.25 | 27.15 | 48,751 | 0.38 | 70.44 | 465 | ..... | 0.41 |
| Class II.—Products of mines and quarries..... | 12,276,929 | 63.47 | 44.22 | 6,826,175 | 52.68 | 50.74 | 5,450,754 | 85.35 | 38.09 |
| Coal and coke | 5,294,047 | 27.37 | 46.98 | 97,865 | 0.75 | 1.89 | 5,196,182 | 81.36 | 85.11 |
| Iron ore | 6,517,162 | 33.69 | 42.58 | 6,490,518 | 50.09 | 85.11 | 26,644 | 0.42 | 0.35 |
| Stone (all kinds) | 364,380 | 1.89 | 66.58 | 161,779 | 1.25 | 52.02 | 202,601 | 3.17 | 85.77 |
| Salt | 50,988 | 0.26 | 9.28 | 25,661 | 0.20 | 8.65 | 25,327 | 0.40 | 10.02 |
| Other products of mines and quarries..... | 50,352 | 0.26 | 52.92 | 50,352 | 0.39 | 86.64 | ..... | ..... | ..... |
| Class III.—Other products..... | 2,510,600 | 12.98 | 20.36 | 2,504,400 | 19.33 | 36.18 | 6,200 | 0.10 | 0.12 |
| Animal products..... | 59,820 | 0.31 | 47.63 | 59,820 | 0.46 | 92.42 | ..... | ..... | ..... |
| Lumber | 2,450,780 | 12.67 | 20.08 | 2,444,580 | 18.87 | 35.65 | 6,200 | 0.10 | 0.12 |
| Class IV.—Manufactures, miscellaneous merchandise, and other commodities..... | 820,501 | 4.24 | 30.86 | 176,185 | 1.36 | 11.60 | 644,316 | 10.09 | 56.49 |

LAKE ONTARIO.

| | | | | | | | | | |
|---|-----------|--------|-------|---------|--------|-------|---------|--------|-------|
| Total | 1,256,947 | 100.00 | 2.45 | 485,220 | 100.00 | 1.87 | 771,727 | 100.00 | 3.05 |
| Class I.—Products of agriculture..... | 131,046 | 10.43 | 1.55 | 130,246 | 26.84 | 3.22 | 800 | 0.11 | 0.02 |
| Wheat | 20,483 | 1.63 | 1.09 | 20,483 | 4.22 | 2.23 | ..... | ..... | ..... |
| Corn | 16,439 | 1.31 | 0.47 | 16,438 | 3.39 | 1.04 | 1 | ..... | ..... |
| Other grains | 89,178 | 7.10 | 9.10 | 89,178 | 18.38 | 18.68 | ..... | ..... | ..... |
| Mill products..... | 7 | ..... | ..... | 7 | ..... | ..... | ..... | ..... | ..... |
| All other farm products..... | 4,939 | 0.39 | 2.73 | 4,140 | 0.85 | 5.98 | 799 | 0.11 | 0.71 |
| Class II.—Products of mines and quarries..... | 773,652 | 61.55 | 2.79 | 9,239 | 1.91 | 0.07 | 764,413 | 99.05 | 5.34 |
| Coal and coke | 771,573 | 61.38 | 6.85 | 7,218 | 1.49 | 0.14 | 764,355 | 99.05 | 12.52 |
| Iron ore | 1,738 | 0.14 | 0.32 | 1,730 | 0.36 | 0.56 | 8 | ..... | ..... |
| Stone (all kinds) | 129 | 0.01 | 0.02 | 79 | 0.02 | 0.03 | 50 | ..... | 0.02 |
| Salt | 212 | 0.02 | 0.22 | 212 | 0.04 | 0.36 | ..... | ..... | ..... |
| Other products of mines and quarries..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Class III.—Other products..... | 320,843 | 25.52 | 2.60 | 320,831 | 66.12 | 4.63 | 12 | ..... | ..... |
| Animal products..... | 601 | 0.05 | 0.48 | 601 | 0.12 | 0.93 | ..... | ..... | ..... |
| Lumber | 320,242 | 25.47 | 2.62 | 320,230 | 66.00 | 4.67 | 12 | ..... | ..... |
| Class IV.—Manufactures, miscellaneous merchandise, and other commodities..... | 31,406 | 2.50 | 1.18 | 24,904 | 5.13 | 1.64 | 6,502 | 0.84 | 0.57 |

TRAFFIC OPERATIONS—Continued.

TABLE 7.—FREIGHT MOVEMENT IN GENERAL—Continued.

ST. LAWRENCE RIVER.

| COMMODITIES. | TOTAL MOVEMENT. | | | RECEIPTS. | | | SHIPMENTS. | | |
|--|-----------------|---------------------------------|---|-----------------|---------------------------------|---|-----------------|---------------------------------|---|
| | Amount in tons. | Per cent of total lake traffic. | Per cent of total commodity traffic on the Great Lakes. | Amount in tons. | Per cent of total lake traffic. | Per cent of total commodity traffic on the Great Lakes. | Amount in tons. | Per cent of total lake traffic. | Per cent of total commodity traffic on the Great Lakes. |
| Total | 731,289 | 100.00 | 1.43 | 492,032 | 100.00 | 1.90 | 239,257 | 100.00 | 0.95 |
| Class I.—Products of agriculture | 243,149 | 33.25 | 2.88 | 237,537 | 48.28 | 5.88 | 5,612 | 2.34 | 0.13 |
| Wheat | 27,059 | 3.70 | 1.43 | 27,059 | 5.50 | 2.94 | | | |
| Corn | 132,031 | 18.05 | 3.76 | 131,927 | 26.81 | 8.33 | 104 | 0.04 | |
| Other grains | 29,731 | 4.07 | 3.03 | 29,731 | 6.04 | 6.23 | | | |
| Mill products | 46,770 | 6.40 | 2.48 | 46,770 | 9.51 | 4.71 | | | |
| All other farm products | 7,558 | 1.03 | 4.17 | 2,050 | 0.42 | 2.96 | 5,508 | 2.30 | 4.92 |
| Class II.—Products of mines and quarries | 180,963 | 25.98 | 0.68 | 80,149 | 16.29 | 0.60 | 109,814 | 45.90 | 0.77 |
| Coal and coke | 180,301 | 24.66 | 1.60 | 74,945 | 15.23 | 1.45 | 105,356 | 44.04 | 1.72 |
| Iron ore | 2,603 | 0.36 | 0.02 | 2,595 | 0.53 | 0.04 | 8 | | |
| Stone (all kinds) | 4,450 | 0.61 | 0.81 | | | | 4,450 | 1.86 | 1.88 |
| Salt | 29 | | | 29 | | 0.01 | | | |
| Other products of mines and quarries | 2,580 | 0.35 | 2.71 | 2,580 | 0.53 | 4.44 | | | |
| Class III.—Other products | 147,710 | 20.20 | 1.20 | 145,968 | 29.66 | 2.11 | 1,742 | 0.73 | 0.03 |
| Animal products | 788 | 0.11 | 0.63 | 788 | 0.16 | 1.22 | | | |
| Lumber | 146,922 | 20.09 | 1.21 | 145,180 | 29.50 | 2.12 | 1,742 | 0.73 | 0.03 |
| Class IV.—Manufactures, miscellaneous merchandise, and other commodities | 150,467 | 20.57 | 5.66 | 28,378 | 5.77 | 1.87 | 122,089 | 51.03 | 10.70 |

STATISTICS OF TRANSPORTATION.

TRAFFIC OPERATIONS—Continued.

TABLE 8.—FREIGHT MOVEMENT IN GENERAL, BY PRINCIPAL PORTS—RECEIPTS, SHIPMENTS, AND TOTAL TRAFFIC MOVEMENT, GROUPED ACCORDING TO THE 13 PRINCIPAL PRODUCTS AND ALLOTTED TO THE 31 PRINCIPAL PORTS, TOGETHER WITH CERTAIN PERCENTAGES OF TRAFFIC APPLIED TO COMMODITIES, AND THE TOTAL FREIGHT MOVEMENT.

TOTAL OF ALL PRODUCTS.

| PORTS. | TOTAL MOVEMENT. | | | RECEIPTS. | | | SHIPMENTS. | | |
|----------------------|-----------------|--------------------------------------|---------------------------------|-----------------|--------------------------------------|---------------------------------|-----------------|--------------------------------------|---------------------------------|
| | Amount in tons. | Per cent of total commodity traffic. | Per cent of total port traffic. | Amount in tons. | Per cent of total commodity traffic. | Per cent of total port traffic. | Amount in tons. | Per cent of total commodity traffic. | Per cent of total port traffic. |
| Total..... | 51,203,106 | 100.00 | 100 | 25,936,132 | 100.00 | 100 | 25,266,974 | 100.00 | 100 |
| Chicago (a)..... | 7,984,038 | 15.59 | 100 | 5,069,973 | 19.55 | 100 | 2,914,065 | 11.53 | 100 |
| Buffalo..... | 6,730,137 | 13.14 | 100 | 4,046,144 | 15.60 | 100 | 2,683,993 | 10.62 | 100 |
| Escanaba..... | 3,626,390 | 7.08 | 100 | 195,558 | 0.75 | 100 | 3,430,832 | 13.58 | 100 |
| Cleveland..... | 3,621,570 | 7.07 | 100 | 2,737,708 | 10.56 | 100 | 883,862 | 3.50 | 100 |
| Ashtabula..... | 2,695,180 | 5.26 | 100 | 2,205,595 | 8.50 | 100 | 489,585 | 1.94 | 100 |
| Ashland..... | 2,247,242 | 4.39 | 100 | 487,358 | 1.88 | 100 | 1,759,884 | 6.97 | 100 |
| Milwaukee..... | 1,935,808 | 3.78 | 100 | 1,584,254 | 6.11 | 100 | 351,554 | 1.39 | 100 |
| Marquette..... | 1,710,885 | 3.34 | 100 | 143,346 | 0.55 | 100 | 1,567,539 | 6.20 | 100 |
| Toledo..... | 1,436,991 | 2.81 | 100 | 506,351 | 1.95 | 100 | 930,640 | 3.68 | 100 |
| Erie..... | 1,271,988 | 2.48 | 100 | 773,030 | 2.98 | 100 | 498,958 | 1.97 | 100 |
| Superior..... | 1,180,297 | 2.31 | 100 | 875,692 | 3.38 | 100 | 304,605 | 1.21 | 100 |
| Duluth..... | 1,114,048 | 2.18 | 100 | 583,162 | 2.26 | 100 | 430,886 | 1.71 | 100 |
| Tonawanda..... | 1,046,895 | 2.04 | 100 | 1,046,895 | 4.04 | 100 | | | |
| Muskegon..... | 1,002,743 | 1.96 | 100 | 151,303 | 0.58 | 100 | 851,440 | 3.37 | 100 |
| Fairport..... | 998,459 | 1.95 | 100 | 939,021 | 3.62 | 100 | 59,438 | 0.24 | 100 |
| Two Harbors..... | 936,541 | 1.83 | 100 | | | | 936,541 | 3.71 | 100 |
| Detroit..... | 764,553 | 1.49 | 100 | 615,750 | 2.37 | 100 | 148,803 | 0.59 | 100 |
| Oswego..... | 691,118 | 1.35 | 100 | 402,847 | 1.55 | 100 | 288,271 | 1.14 | 100 |
| Ogdensburg..... | 662,904 | 1.30 | 100 | 470,044 | 1.81 | 100 | 192,860 | 0.76 | 100 |
| Manistee..... | 629,910 | 1.23 | 100 | 28,096 | 0.11 | 100 | 601,814 | 2.38 | 100 |
| Ludington..... | 627,627 | 1.23 | 100 | 276,229 | 1.06 | 100 | 351,398 | 1.39 | 100 |
| Lorain..... | 620,773 | 1.21 | 100 | 346,899 | 1.34 | 100 | 273,874 | 1.08 | 100 |
| Sandusky..... | 602,403 | 1.18 | 100 | 305,029 | 1.18 | 100 | 297,374 | 1.18 | 100 |
| Bay city..... | 553,219 | 1.08 | 100 | 66,246 | 0.26 | 100 | 486,973 | 1.93 | 100 |
| Oscoda..... | 490,412 | 0.96 | 100 | | | | 490,413 | 1.94 | 100 |
| Alpena..... | 385,868 | 0.76 | 100 | 11,969 | 0.05 | 100 | 374,899 | 1.48 | 100 |
| Charlotte..... | 368,361 | 0.72 | 100 | 18,318 | 0.07 | 100 | 350,043 | 1.39 | 100 |
| Marinette..... | 346,246 | 0.68 | 100 | 4,244 | 0.02 | 100 | 342,002 | 1.35 | 100 |
| Gladstone..... | 287,590 | 0.56 | 100 | 132,356 | 0.51 | 100 | 155,234 | 0.61 | 100 |
| Houghton..... | 286,191 | 0.56 | 100 | 208,047 | 0.80 | 100 | 78,144 | 0.31 | 100 |
| Menominee..... | 272,529 | 0.53 | 100 | 7,426 | 0.03 | 100 | 265,103 | 1.05 | 100 |
| All other ports..... | 4,073,189 | 7.95 | 100 | 1,597,242 | 6.16 | 100 | 2,475,947 | 9.80 | 100 |

a Including South Chicago.

TRAFFIC OPERATIONS—Continued.

TABLE 8.—FREIGHT MOVEMENT, IN GENERAL, BY PRINCIPAL PORTS—Continued.

A.—PRODUCTS OF AGRICULTURE.

| PORTS. | AGGREGATE. | | | | | | | | |
|----------------------|-----------------|---|---------------------------------|-----------------|---|---------------------------------|-----------------|---|---------------------------------|
| | Total movement. | | | Receipts. | | | Shipments. | | |
| | Amount in tons. | Per cent of total product of agriculture traffic. | Per cent of total port traffic. | Amount in tons. | Per cent of total product of agriculture traffic. | Per cent of total port traffic. | Amount in tons. | Per cent of total product of agriculture traffic. | Per cent of total port traffic. |
| Total..... | 8,449,806 | 100.00 | 16.50 | 4,041,738 | 100.00 | 15.58 | 4,408,068 | 100.00 | 17.45 |
| Chicago (a)..... | 2,829,895 | 33.49 | 35.45 | 10,854 | 0.27 | 0.21 | 2,819,041 | 63.95 | 96.74 |
| Buffalo..... | 3,132,433 | 37.07 | 48.54 | 3,132,433 | 77.50 | 77.42 | | | |
| Escanaba..... | 4,543 | 0.05 | 0.13 | 35 | 0.02 | 0.02 | 4,508 | 0.10 | 0.13 |
| Cleveland..... | 25,440 | 0.30 | 0.70 | 24,649 | 0.61 | 0.90 | 791 | 0.02 | 0.09 |
| Ashtabula..... | | | | | | | | | |
| Ashland..... | | | | | | | | | |
| Milwaukee..... | 348,782 | 4.13 | 18.02 | 120 | | 0.01 | 348,662 | 7.91 | 90.18 |
| Marquette..... | 8 | | | 8 | | | | | |
| Toledo..... | 275,532 | 3.26 | 19.17 | | | | 275,532 | 6.25 | 29.61 |
| Erie..... | 293,641 | 3.48 | 23.08 | 293,641 | 7.27 | 37.99 | | | |
| Superior..... | 292,410 | 3.46 | 24.77 | | | | 292,410 | 6.64 | 96.00 |
| Duluth..... | 362,889 | 4.30 | 32.57 | | | | 362,889 | 8.23 | 84.22 |
| Tonawanda..... | | | | | | | | | |
| Muskegon..... | 5,327 | 0.06 | 0.59 | 5,327 | 0.13 | 3.52 | | | |
| Fairport..... | | | | | | | | | |
| Two Harbors..... | | | | | | | | | |
| Detroit..... | 121,832 | 1.44 | 15.94 | 7,148 | 0.18 | 1.16 | 114,684 | 2.60 | 77.07 |
| Oswego..... | 116,068 | 1.37 | 16.79 | 116,068 | 2.87 | 28.81 | | | |
| Ogdensburg..... | 242,456 | 2.87 | 36.57 | 237,332 | 5.87 | 50.49 | 5,124 | 0.12 | 2.66 |
| Manistee..... | 6,208 | 0.07 | 0.98 | 6,196 | 0.15 | 22.05 | 12 | | |
| Ludington..... | 61,288 | 0.73 | 9.76 | 61,288 | 1.52 | 22.19 | | | |
| Lorain..... | | | | | | | | | |
| Sandusky..... | 8,063 | 0.10 | 1.34 | | | | 8,063 | 0.18 | 2.71 |
| Bay city..... | | | | | | | | | |
| Oscoda..... | 94 | | 0.02 | | | | 94 | | 0.02 |
| Alpena..... | 5,144 | 0.06 | 1.33 | 5,144 | 0.13 | 42.98 | | | |
| Charlotte..... | 5,406 | 0.06 | 1.47 | 5,406 | 0.14 | 29.51 | | | |
| Marinette..... | 16 | | | 16 | | 0.38 | | | |
| Gladstone..... | 72,354 | 0.86 | 25.16 | | | | 72,354 | 1.64 | 46.61 |
| Houghton..... | | | | | | | | | |
| Menominee..... | 80 | | 0.03 | 80 | | 1.08 | | | |
| All other ports..... | 239,897 | 2.84 | 5.89 | 135,993 | 3.36 | 8.51 | 103,904 | 2.36 | 4.20 |

| PORTS. | WHEAT. | | | | | | | | |
|----------------------|-----------------|----------------------------------|---------------------------------|-----------------|----------------------------------|---------------------------------|-----------------|----------------------------------|---------------------------------|
| | Total movement. | | | Receipts. | | | Shipments. | | |
| | Amount in tons. | Per cent of total wheat traffic. | Per cent of total port traffic. | Amount in tons. | Per cent of total wheat traffic. | Per cent of total port traffic. | Amount in tons. | Per cent of total wheat traffic. | Per cent of total port traffic. |
| Total..... | 1,888,312 | 100.00 | 3.69 | 919,162 | 100.00 | 3.54 | 969,150 | 100.00 | 3.84 |
| Chicago (a)..... | 312,203 | 16.53 | 3.91 | | | | 312,203 | 32.21 | 10.71 |
| Buffalo..... | 781,548 | 41.39 | 11.61 | 781,548 | 85.03 | 19.32 | | | |
| Escanaba..... | | | | | | | | | |
| Cleveland..... | 22,494 | 1.19 | 0.62 | 22,494 | 2.45 | 0.82 | | | |
| Ashtabula..... | | | | | | | | | |
| Ashland..... | | | | | | | | | |
| Milwaukee..... | 29,191 | 1.55 | 1.51 | | | | 29,191 | 3.01 | 8.30 |
| Marquette..... | | | | | | | | | |
| Toledo..... | 132,363 | 7.01 | 9.21 | | | | 132,363 | 13.66 | 14.22 |
| Erie..... | 33,779 | 1.79 | 2.65 | 33,779 | 3.67 | 4.37 | | | |
| Superior..... | 191,623 | 10.15 | 16.23 | | | | 191,623 | 19.77 | 62.91 |
| Duluth..... | 207,732 | 11.00 | 18.64 | | | | 207,732 | 21.44 | 48.21 |
| Tonawanda..... | | | | | | | | | |
| Muskegon..... | 692 | 0.04 | 0.07 | 692 | 0.08 | 0.46 | | | |
| Fairport..... | | | | | | | | | |
| Two Harbors..... | | | | | | | | | |
| Detroit..... | 82,576 | 4.37 | 10.80 | 1,819 | 0.20 | 0.30 | 80,757 | 8.33 | 54.27 |
| Oswego..... | 19,297 | 1.02 | 2.79 | 19,297 | 2.10 | 4.79 | | | |
| Ogdensburg..... | 27,058 | 1.43 | 4.08 | 27,058 | 2.94 | 5.76 | | | |
| Manistee..... | | | | | | | | | |
| Ludington..... | | | | | | | | | |
| Lorain..... | | | | | | | | | |
| Sandusky..... | 8,063 | 0.43 | 1.34 | | | | 8,063 | 0.83 | 2.71 |
| Bay city..... | | | | | | | | | |
| Oscoda..... | | | | | | | | | |
| Alpena..... | | | | | | | | | |
| Charlotte..... | | | | | | | | | |
| Marinette..... | | | | | | | | | |
| Gladstone..... | 1,500 | 0.08 | 0.52 | | | | 1,500 | 0.16 | 0.97 |
| Houghton..... | | | | | | | | | |
| Menominee..... | | | | | | | | | |
| All other ports..... | 38,193 | 2.02 | 0.94 | 32,475 | 3.53 | 2.03 | 5,718 | 0.59 | 0.23 |

a Including South Chicago.

STATISTICS OF TRANSPORTATION.

TRAFFIC OPERATIONS—Continued.

TABLE 8.—FREIGHT MOVEMENT IN GENERAL, BY PRINCIPAL PORTS—Continued.

A.—PRODUCTS OF AGRICULTURE—Continued.

| PORTS. | CORN. | | | | | | | | |
|----------------------|-----------------|---------------------------------|---------------------------------|-----------------|---------------------------------|---------------------------------|-----------------|---------------------------------|---------------------------------|
| | Total movement. | | | Receipts. | | | Shipments. | | |
| | Amount in tons. | Per cent of total corn traffic. | Per cent of total port traffic. | Amount in tons. | Per cent of total corn traffic. | Per cent of total port traffic. | Amount in tons. | Per cent of total corn traffic. | Per cent of total port traffic. |
| Total..... | 3,513,515 | 100.00 | 6.86 | 1,583,901 | 100.00 | 6.11 | 1,929,614 | 100.00 | 7.64 |
| Chicago (a)..... | 1,769,621 | 50.37 | 22.17 | 1,319,560 | 83.31 | 32.61 | 1,769,621 | 91.71 | 60.73 |
| Buffalo..... | 1,319,560 | 37.56 | 19.60 | ..... | ..... | ..... | ..... | ..... | ..... |
| Escanaba..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Cleveland..... | 1,010 | 0.03 | 0.03 | 494 | 0.03 | 0.02 | 576 | 0.03 | 0.07 |
| Ashtabula..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Ashland..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Milwaukee..... | 1,434 | 0.04 | 0.08 | ..... | ..... | ..... | 1,434 | 0.07 | 0.41 |
| Marquette..... | 8 | ..... | ..... | 8 | ..... | ..... | ..... | ..... | ..... |
| Toledo..... | 73,952 | 2.11 | 5.14 | ..... | ..... | ..... | 73,952 | 3.83 | 7.95 |
| Erie..... | 98,623 | 2.81 | 7.75 | 98,623 | 6.23 | 12.76 | ..... | ..... | ..... |
| Superior..... | 5,211 | 0.15 | 0.44 | ..... | ..... | ..... | 5,211 | 0.27 | 1.72 |
| Duluth..... | 49,901 | 1.42 | 4.48 | ..... | ..... | ..... | 49,901 | 2.59 | 11.58 |
| Tonawanda..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Muskegon..... | 2,608 | 0.07 | 0.26 | 2,608 | 0.16 | 1.72 | ..... | ..... | ..... |
| Fairport..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Two Harbors..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Detroit..... | 31,778 | 0.90 | 4.16 | 4,242 | 0.27 | 0.69 | 27,536 | 1.43 | 18.51 |
| Oswego..... | 16,434 | 0.47 | 2.38 | 16,434 | 1.04 | 4.08 | ..... | ..... | ..... |
| Ogdensburg..... | 131,907 | 3.75 | 19.90 | 131,907 | 8.33 | 28.06 | ..... | ..... | ..... |
| Manistee..... | 217 | 0.01 | 0.03 | 217 | 0.01 | 0.77 | ..... | ..... | ..... |
| Ludington..... | 163 | ..... | 0.03 | 163 | 0.01 | 0.06 | ..... | ..... | ..... |
| Lorain..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Sandusky..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Bay city..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Oscoda..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Alpena..... | 168 | ..... | 0.04 | 168 | 0.01 | 1.40 | ..... | ..... | ..... |
| Charlotte..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Marinette..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Gladstone..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Houghton..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Menominee..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| All other ports..... | 10,920 | 0.31 | 0.27 | 9,537 | 0.60 | 0.60 | 1,383 | 0.07 | 0.06 |

| PORTS. | OTHER GRAINS. | | | | | | | | |
|----------------------|-----------------|--|---------------------------------|-----------------|--|---------------------------------|-----------------|--|---------------------------------|
| | Total movement. | | | Receipts. | | | Shipments. | | |
| | Amount in tons. | Per cent of total other grain traffic. | Per cent of total port traffic. | Amount in tons. | Per cent of total other grain traffic. | Per cent of total port traffic. | Amount in tons. | Per cent of total other grain traffic. | Per cent of total port traffic. |
| Total..... | 980,514 | 100.00 | 1.92 | 477,397 | 100.00 | 1.84 | 503,117 | 100.00 | 1.99 |
| Chicago (a)..... | 457,095 | 46.62 | 5.73 | ..... | ..... | ..... | 457,095 | 90.85 | 15.69 |
| Buffalo..... | 316,987 | 32.33 | 4.71 | 316,987 | 66.40 | 7.83 | ..... | ..... | ..... |
| Escanaba..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Cleveland..... | 685 | 0.07 | 0.02 | 685 | 0.14 | 0.02 | ..... | ..... | ..... |
| Ashtabula..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Ashland..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Milwaukee..... | 28,847 | 2.94 | 1.49 | ..... | ..... | ..... | 28,847 | 5.73 | 8.21 |
| Marquette..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Toledo..... | 5,560 | 0.57 | 0.89 | ..... | ..... | ..... | 5,560 | 1.11 | 0.60 |
| Erie..... | 13,452 | 1.37 | 1.06 | 13,452 | 2.82 | 1.74 | ..... | ..... | ..... |
| Superior..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Duluth..... | 1,304 | 0.13 | 0.12 | ..... | ..... | ..... | 1,304 | 0.26 | 0.80 |
| Tonawanda..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Muskegon..... | 1,840 | 0.19 | 0.18 | 1,840 | 0.39 | 1.22 | ..... | ..... | ..... |
| Fairport..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Two Harbors..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Detroit..... | 2,850 | 0.29 | 0.37 | 840 | 0.20 | 0.15 | 1,910 | 0.38 | 1.28 |
| Oswego..... | 78,340 | 7.99 | 11.33 | 78,340 | 16.41 | 19.45 | ..... | ..... | ..... |
| Ogdensburg..... | 29,581 | 3.02 | 4.46 | 29,581 | 6.20 | 6.29 | ..... | ..... | ..... |
| Manistee..... | 1,193 | 0.12 | 0.19 | 1,193 | 0.25 | 4.25 | ..... | ..... | ..... |
| Ludington..... | 965 | 0.10 | 0.15 | 965 | 0.20 | 0.35 | ..... | ..... | ..... |
| Lorain..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Sandusky..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Bay city..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Oscoda..... | 64 | ..... | 0.01 | ..... | ..... | ..... | 64 | 0.01 | 0.01 |
| Alpena..... | 4,976 | 0.51 | 1.29 | 4,976 | 1.04 | 41.58 | ..... | ..... | ..... |
| Charlotte..... | 5,406 | 0.55 | 1.47 | 5,406 | 1.13 | 29.51 | ..... | ..... | ..... |
| Marinette..... | 16 | ..... | ..... | 16 | ..... | 0.38 | ..... | ..... | ..... |
| Gladstone..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Houghton..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Menominee..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| All other ports..... | 81,353 | 3.20 | 0.77 | 23,016 | 4.82 | 1.44 | 8,337 | 1.66 | 0.34 |

a Including South Chicago.

TRANSPORTATION ON THE GREAT LAKES.

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TRAFFIC OPERATIONS—Continued.

TABLE 8.—FREIGHT MOVEMENT IN GENERAL, BY PRINCIPAL PORTS—Continued.

A.—PRODUCTS OF AGRICULTURE—Continued.

| PORTS. | MILL PRODUCTS. | | | | | | | | |
|----------------------|-----------------|---|---------------------------------|-----------------|---|---------------------------------|-----------------|---|---------------------------------|
| | Total movement. | | | Receipts. | | | Shipments. | | |
| | Amount in tons. | Per cent of total mill product traffic. | Per cent of total port traffic. | Amount in tons. | Per cent of total mill product traffic. | Per cent of total port traffic. | Amount in tons. | Per cent of total mill product traffic. | Per cent of total port traffic. |
| Total..... | 1,886,189 | 100.00 | 3.68 | 992,066 | 100.00 | 3.82 | 894,123 | 100.00 | 3.54 |
| Chicago (a)..... | 229,988 | 12.19 | 2.88 | 1,860 | 0.19 | 0.03 | 228,138 | 25.52 | 7.83 |
| Buffalo..... | 666,651 | 35.35 | 9.91 | 666,651 | 67.20 | 16.48 | ..... | ..... | ..... |
| Escanaba..... | 4,543 | 0.24 | 0.13 | 35 | 0.03 | 0.02 | 4,508 | 0.50 | 0.13 |
| Cleveland..... | 252 | 0.01 | ..... | 252 | 0.03 | 0.01 | ..... | ..... | ..... |
| Ashtabula..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Ashland..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Milwaukee..... | 289,174 | 15.33 | 14.93 | ..... | ..... | ..... | 289,174 | 32.34 | 82.26 |
| Marquette..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Toledo..... | 63,657 | 3.38 | 4.43 | ..... | ..... | ..... | 63,657 | 7.12 | 6.84 |
| Erie..... | 147,507 | 7.82 | 11.60 | 147,507 | 14.87 | 19.08 | ..... | ..... | ..... |
| Superior..... | 95,576 | 5.07 | 8.10 | ..... | ..... | ..... | 95,576 | 10.69 | 31.37 |
| Duluth..... | 103,134 | 5.47 | 9.26 | ..... | ..... | ..... | 103,134 | 11.54 | 23.94 |
| Tonawanda..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Muskegon..... | 33 | ..... | ..... | 33 | ..... | 0.02 | ..... | ..... | ..... |
| Fairport..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Two Harbors..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Detroit..... | 999 | 0.05 | 0.13 | ..... | ..... | ..... | 999 | 0.11 | 0.67 |
| Oswego..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Ogdensburg..... | 46,770 | 2.48 | 7.05 | 46,770 | 4.72 | 9.95 | ..... | ..... | ..... |
| Manistee..... | 3,078 | 0.16 | 0.49 | 3,078 | 0.31 | 10.95 | ..... | ..... | ..... |
| Ludington..... | 60,160 | 3.19 | 9.58 | 60,160 | 6.06 | 21.78 | ..... | ..... | ..... |
| Lorain..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Sandusky..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Bay city..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Oscoda..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Alpena..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Charlotte..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Marinette..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Gladstone..... | 70,854 | 3.76 | 24.64 | ..... | ..... | ..... | 70,854 | 7.92 | 45.64 |
| Houghton..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Menominee..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| All other ports..... | 103,803 | 5.50 | 2.55 | 65,720 | 6.62 | 4.11 | 38,083 | 4.26 | 1.54 |

| PORTS. | ALL OTHER FARM PRODUCTS. | | | | | | | | |
|----------------------|--------------------------|---|---------------------------------|-----------------|---|---------------------------------|-----------------|---|---------------------------------|
| | Total movement. | | | Receipts. | | | Shipments. | | |
| | Amount in tons. | Per cent of total other farm product traffic. | Per cent of total port traffic. | Amount in tons. | Per cent of total other farm product traffic. | Per cent of total port traffic. | Amount in tons. | Per cent of total other farm product traffic. | Per cent of total port traffic. |
| Total..... | 181,276 | 100.00 | 0.35 | 69,212 | 100.00 | 0.27 | 112,064 | 100.00 | 0.44 |
| Chicago (a)..... | 60,978 | 33.64 | 0.76 | 8,994 | 13.00 | 0.18 | 51,984 | 46.39 | 1.78 |
| Buffalo..... | 47,687 | 26.31 | 0.71 | 47,687 | 68.90 | 1.18 | ..... | ..... | ..... |
| Escanaba..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Cleveland..... | 999 | 0.55 | 0.03 | 784 | 1.13 | 0.03 | 215 | 0.19 | 0.02 |
| Ashtabula..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Ashland..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Milwaukee..... | 136 | 0.08 | 0.01 | 120 | 0.17 | 0.01 | 16 | 0.01 | ..... |
| Marquette..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Toledo..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Erie..... | 280 | 0.15 | 0.02 | 280 | 0.40 | 0.04 | ..... | ..... | ..... |
| Superior..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Duluth..... | 818 | 0.45 | 0.07 | ..... | ..... | ..... | 818 | 0.73 | 0.19 |
| Tonawanda..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Muskegon..... | 154 | 0.08 | 0.02 | 154 | 0.22 | 0.10 | ..... | ..... | ..... |
| Fairport..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Two Harbors..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Detroit..... | 3,629 | 2.00 | 0.48 | 147 | 0.21 | 0.02 | 3,482 | 3.11 | 2.34 |
| Oswego..... | 1,997 | 1.10 | 0.29 | 1,997 | 2.89 | 0.49 | ..... | ..... | ..... |
| Ogdensburg..... | 7,140 | 3.94 | 1.08 | 2,016 | 2.91 | 0.43 | 5,124 | 4.57 | 2.66 |
| Manistee..... | 1,720 | 0.95 | 0.27 | 1,708 | 2.47 | 6.08 | 12 | 0.01 | ..... |
| Ludington..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Lorain..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Sandusky..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Bay city..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Oscoda..... | 30 | 0.02 | 0.01 | ..... | ..... | ..... | 30 | 0.03 | 0.01 |
| Alpena..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Charlotte..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Marinette..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Gladstone..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Houghton..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Menominee..... | 80 | 0.04 | 0.03 | 80 | 0.12 | 1.08 | ..... | ..... | ..... |
| All other ports..... | 55,628 | 30.69 | 1.86 | 5,245 | 7.58 | 0.33 | 50,383 | 44.96 | 2.03 |

a Including South Chicago.

STATISTICS OF TRANSPORTATION.

TRAFFIC OPERATIONS—Continued.

TABLE 8.—FREIGHT MOVEMENT IN GENERAL, BY PRINCIPAL PORTS—Continued.

B.—PRODUCTS OF MINES AND QUARRIES.

| PORTS. | AGGREGATE. | | | | | | | | |
|----------------------|-----------------|--|---------------------------------|-----------------|--|---------------------------------|-----------------|--|---------------------------------|
| | Total movement. | | | Receipts. | | | Shipments. | | |
| | Amount in tons. | Per cent of total mine and quarry traffic. | Per cent of total port traffic. | Amount in tons. | Per cent of total mine and quarry traffic. | Per cent of total port traffic. | Amount in tons. | Per cent of total mine and quarry traffic. | Per cent of total port traffic. |
| Total..... | 27,763,178 | 100.00 | 54.22 | 13,454,189 | 100.00 | 51.88 | 14,308,989 | 100.00 | 56.63 |
| Chicago (a)..... | 2,209,284 | 7.96 | 27.07 | 2,209,276 | 16.42 | 43.58 | 8 | | |
| Buffalo..... | 2,568,035 | 9.25 | 38.16 | 386,006 | 2.87 | 9.54 | 2,181,969 | 15.25 | 81.30 |
| Escanaba..... | 3,558,620 | 12.82 | 98.13 | 194,521 | 1.44 | 99.47 | 3,364,099 | 23.51 | 98.06 |
| Cleveland..... | 2,951,439 | 10.63 | 81.50 | 2,092,187 | 15.55 | 76.42 | 859,252 | 6.01 | 97.22 |
| Ashtabula..... | 2,690,944 | 9.69 | 99.84 | 2,201,359 | 16.36 | 99.81 | 489,585 | 3.42 | 100.00 |
| Ashland..... | 1,867,712 | 6.73 | 33.11 | 204,691 | 1.52 | 42.00 | 1,663,021 | 11.62 | 94.50 |
| Milwaukee..... | 1,107,543 | 3.99 | 57.21 | 1,107,543 | 8.23 | 69.91 | | | |
| Marquette..... | 1,680,991 | 6.05 | 98.20 | 138,696 | 1.03 | 96.69 | 1,541,495 | 10.77 | 98.34 |
| Toledo..... | 863,488 | 3.11 | 60.09 | 213,488 | 1.59 | 42.16 | 650,000 | 4.54 | 69.84 |
| Erie..... | 835,910 | 3.01 | 65.72 | 425,507 | 3.16 | 55.04 | 410,403 | 2.87 | 82.25 |
| Superior..... | 733,506 | 2.64 | 62.15 | 726,537 | 5.40 | 82.97 | 6,969 | 0.05 | 2.29 |
| Duluth..... | 538,916 | 1.94 | 48.38 | 538,916 | 4.00 | 78.89 | | | |
| Tonawanda..... | 17,166 | 0.06 | 1.64 | 17,166 | 0.13 | 1.64 | | | |
| Muskegon..... | 15,733 | 0.06 | 1.57 | 15,733 | 0.12 | 10.40 | | | |
| Fairport..... | 990,124 | 3.57 | 99.17 | 930,686 | 6.92 | 99.11 | 59,438 | 0.41 | 100.00 |
| Two Harbors..... | 936,541 | 3.37 | 100.00 | | | | 936,541 | 6.55 | 100.00 |
| Detroit..... | 287,277 | 1.03 | 37.57 | 280,675 | 2.09 | 45.58 | 6,602 | 0.05 | 4.44 |
| Oswego..... | 282,148 | 1.02 | 40.83 | | | | 282,148 | 1.97 | 97.88 |
| Ogdensburg..... | 136,754 | 0.50 | 20.63 | 71,398 | 0.53 | 15.19 | 65,356 | 0.46 | 33.89 |
| Manistee..... | 114,188 | 0.41 | 18.13 | 9,187 | 0.07 | 32.70 | 105,001 | 0.73 | 17.45 |
| Ludington..... | 61,804 | 0.22 | 9.85 | 4,583 | 0.03 | 1.66 | 57,221 | 0.40 | 16.28 |
| Lorain..... | 613,704 | 2.22 | 98.86 | 340,033 | 2.53 | 98.02 | 273,671 | 1.91 | 99.93 |
| Sandusky..... | 504,188 | 1.82 | 83.70 | 214,877 | 1.60 | 70.44 | 289,311 | 2.02 | 97.29 |
| Bay city..... | 67,423 | 0.24 | 12.19 | 62,046 | 0.46 | 93.66 | 5,377 | 0.04 | 1.10 |
| Oscoda..... | 322 | | 0.07 | | | | 322 | | 0.07 |
| Alpena..... | 6,825 | 0.02 | 1.76 | 6,825 | 0.05 | 57.02 | | | |
| Charlotte..... | 350,000 | 1.26 | 95.01 | | | | 350,000 | 2.45 | 99.99 |
| Marinette..... | 2,999 | 0.01 | 0.87 | 2,957 | 0.02 | 69.67 | 42 | | 0.01 |
| Gladstone..... | 208,940 | 0.75 | 72.65 | 126,060 | 0.94 | 95.24 | 82,880 | 0.58 | 53.39 |
| Houghton..... | 235,187 | 0.85 | 82.18 | 166,523 | 1.24 | 80.04 | 68,664 | 0.48 | 87.87 |
| Menominee..... | 1,346 | | 0.49 | 1,346 | 0.01 | 18.12 | | | |
| All other ports..... | 1,325,021 | 4.77 | 32.53 | 765,407 | 5.69 | 47.92 | 559,614 | 3.91 | 22.60 |

| PORTS. | COAL AND COKE. | | | | | | | | |
|----------------------|-----------------|--|---------------------------------|-----------------|--|---------------------------------|-----------------|--|---------------------------------|
| | Total movement. | | | Receipts. | | | Shipments. | | |
| | Amount in tons. | Per cent of total coal and coke traffic. | Per cent of total port traffic. | Amount in tons. | Per cent of total coal and coke traffic. | Per cent of total port traffic. | Amount in tons. | Per cent of total coal and coke traffic. | Per cent of total port traffic. |
| Total..... | 11,268,270 | 100.00 | 22.01 | 5,162,471 | 100.00 | 19.91 | 6,105,799 | 100.00 | 24.17 |
| Chicago (a)..... | 1,329,364 | 11.80 | 16.65 | 1,329,364 | 25.75 | 26.22 | | | |
| Buffalo..... | 2,156,670 | 19.14 | 32.05 | | | | 2,156,670 | 35.32 | 80.36 |
| Escanaba..... | 194,199 | 1.72 | 5.86 | 194,199 | 3.76 | 99.30 | | | |
| Cleveland..... | 826,230 | 7.33 | 22.82 | 1,200 | 0.02 | 0.04 | 825,030 | 13.52 | 93.34 |
| Ashtabula..... | 489,585 | 4.35 | 18.17 | | | | 489,585 | 8.02 | 100.00 |
| Ashland..... | 201,241 | 1.79 | 8.96 | 201,241 | 3.90 | 41.29 | | | |
| Milwaukee..... | 907,743 | 8.06 | 46.89 | 907,743 | 17.58 | 57.30 | | | |
| Marquette..... | 126,421 | 1.12 | 7.39 | 126,421 | 2.45 | 88.19 | | | |
| Toledo..... | 743,369 | 6.60 | 51.73 | 93,369 | 1.81 | 18.44 | 650,000 | 10.65 | 69.84 |
| Erie..... | 410,403 | 3.64 | 32.27 | | | | 410,403 | 6.72 | 82.25 |
| Superior..... | 720,000 | 6.39 | 61.00 | 720,000 | 13.95 | 82.22 | | | |
| Duluth..... | 485,000 | 4.30 | 43.54 | 485,000 | 9.39 | 70.99 | | | |
| Tonawanda..... | | | | | | | | | |
| Muskegon..... | 3,620 | 0.03 | 0.36 | 3,620 | 0.07 | 2.39 | | | |
| Fairport..... | 59,438 | 0.53 | 5.95 | | | | 59,438 | 0.97 | 100.00 |
| Two Harbors..... | | | | | | | | | |
| Detroit..... | 145,464 | 1.29 | 19.02 | 141,900 | 2.75 | 23.04 | 3,564 | 0.06 | 2.40 |
| Oswego..... | 282,098 | 2.50 | 40.82 | | | | 282,098 | 4.62 | 97.86 |
| Ogdensburg..... | 131,587 | 1.17 | 19.85 | 66,231 | 1.28 | 14.09 | 65,356 | 1.07 | 33.89 |
| Manistee..... | 9,187 | 0.08 | 1.46 | 9,187 | 0.18 | 32.70 | | | |
| Ludington..... | 4,583 | 0.04 | 0.73 | 4,583 | 0.09 | 1.66 | | | |
| Lorain..... | 273,671 | 2.43 | 44.08 | | | | 273,671 | 4.48 | 99.93 |
| Sandusky..... | 279,946 | 2.46 | 45.98 | 1,561 | 0.03 | 0.51 | 275,385 | 4.51 | 92.60 |
| Bay city..... | 51,000 | 0.45 | 9.22 | 51,000 | 0.99 | 76.98 | | | |
| Oscoda..... | | | | | | | | | |
| Alpena..... | 6,000 | 0.05 | 1.55 | 6,000 | 0.12 | 50.13 | | | |
| Charlotte..... | 350,000 | 3.11 | 95.01 | | | | 350,000 | 5.73 | 99.99 |
| Marinette..... | 2,870 | 0.03 | 0.83 | 2,870 | 0.06 | 67.62 | | | |
| Gladstone..... | 122,000 | 1.08 | 42.42 | 122,000 | 2.36 | 92.17 | | | |
| Houghton..... | 169,336 | 1.50 | 59.17 | 144,261 | 2.79 | 69.34 | 25,075 | 0.41 | 32.09 |
| Menominee..... | 1,150 | 0.01 | 0.42 | 1,150 | 0.02 | 15.48 | | | |
| All other ports..... | 789,095 | 7.00 | 19.37 | 549,571 | 10.65 | 34.41 | 239,524 | 3.92 | 9.67 |

a Including South Chicago.